ALLEN CAREER INSTITUTE
KOTA (RAJASTHAN)
path to success

Session : 2024-25

Achiever Test Series/Joint Package : Topic Wise Syllabus & Schedule
Target : NEET(UG) 2025 (Class XII / XII Pass /Repeater Students)

Test No.	Test Date	Test Type	Test Pattern	Test Timings	Mode of Test	Subject	Topics Covered
MINOR TEST							
1	13/10/2024	UNIT TEST- 1	NEET (UG)	1 PM-4:20 PM	PEN PAPER (Available in Online CBT mode for Practice)	Physics	Basic Mathematics Used In Physics, Vectors, Unit, Dimension and Measurements, Kinematics, Newton's Laws of Motion and Friction
						Chemistry	Atomic Structure, Some basic concepts of Chemistry, Equilibrium, Redox reactions
						Biology	Reproduction : Sexual Reproduction in Flowering Plants, Human Reproduction, Reproductive Health
2	27/10/2024	UNIT TEST- 2	NEET (UG)	1 PM-4:20 PM	PEN PAPER (Available in Online CBT mode for Practice)	Physics	Work, Energy & Power, Circular Motion, Centre of Mass and Collisions, Rotational Motion
						Chemistry	Chemical kinetics, Solutions
						Biology	Genetics : Principles Of Inheritance And Variation, Molecular Basis Of Inheritance, Biotechnology : Principles And Processes, Biotechnology And Its Applications, Microbes In Human Welfare, Tissue Culture
3	10/11/2024	UNIT TEST- 3	NEET (UG)	1 PM-4:20 PM	PEN PAPER (Available in Online CBT mode for Practice)	Physics	Properties of matter and Fluid Mechanics, Thermal Physics (Temperature and Thermal Expansion, Calorimetry, Heat Transfer conduction, KTG & Thermodynamics)
						Chemistry	Chemical Thermodynamics , Electrochemistry, Periodic Table
						Biology	Diversity In The Living World :The Living World, Biological Classification, Plant Kingdom, Animal Kingdom, Evolution :Origin And Evolution
4	24/11/2024	UNIT TEST- 4	NEET (UG)	1 PM-4:20 PM	PEN PAPER (Available in Online CBT mode for Practice)	Physics	Gravitation , Oscillations, Wave Motion
						Chemistry	Chemical Bonding, Molecular Structure, d & f-block elements
						Biology	Plant Physiology : Plant Growth and Development, Biomolecule with Enzyme , Human Physiology : Breathing And Exchange Of Gases (Respiratory System), Body Fluids And Circulation (Circulatory System)
5	08/12/2024	REVIEW TEST-1	NEET (UG)	1 PM-4:20 PM	PEN PAPER (Available in Online CBT mode for Practice)	Physics	Syllabus of Test No. 1,2,3 & 4 (Unit Test- 1 to 4)
						Chemistry	
						Biology	
6	22/12/2024	UNIT TEST- 5	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Electrostatics, Capacitor, Current electricity
						Chemistry	P-block elements (group 13 to 18), Coordination Compounds
						Biology	Photosynthesis in Higher Plants, Respiration in Plants, Excretory Products And Their Elimination (Excretory System), Cockroach, Frog
7	05/01/2025	UNIT TEST- 6	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Magnetic effect of current and Magnetism, Electromagnetic Induction, Alternating current, Electromagnetic Waves
						Chemistry	Classification & Nomenclature, Isomerism, General Organic Chemistry, Purification and Characterisation of Organic Compounds
						Biology	Ecology : Organisms and Populations, Ecosystem, Biodiversity and Conservation, Biology In Human Welfare , Human Health and Disease
8	19/01/2025	UNIT TEST- 7	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Ray Optics and Optical Instruments, Wave optics
						Chemistry	Hydrocarbons, Organic Compounds Containing Halogens (Haloalkanes and Haloarenes)
						Biology	Cell : Structure And Functions Cell : The Unit Of Life, Cell Cycle And Cell Division, Structural Organisation In Animals (Animal Tissue), Locomotion And Movement (Muscles, Skeletal System)

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Test No.	Test Date	Test Type	Test Pattern	Test Timings	Mode of Test	Subject	Topics Covered
MINOR TEST							
9	02/02/2025	UNIT TEST- 8	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Modern Physics I, II & III, Semiconductor and Digital Electronics, Experimental Skills (Practical 1 to18)
						Chemistry	Oxygen containing organic compounds, Nitrogen containing organic compounds, Biomolecules, Principles related to practical chemistry
						Biology	Morphology Of Flowering Plants, Anatomy Of Flowering Plants, Neural Control And Co-ordination (Nervous System), Chemical Co-ordination And Integration (Endocrine System)
10	16/02/2025	REVIEW TEST-2	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Syllabus of Test No. 6, 7, 8 & 9 (Unit Test- 5 to 8)
						Chemistry	
						Biology	
MAJOR TEST							
1	02/03/2025	MAJOR TEST	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
2	09/03/2025	MAJOR TEST	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
3	16/03/2025	MAJOR TEST	NEET (UG)	2 PM-5:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
4	23/03/2025	MAJOR TEST	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
5	30\03\2025	MAJOR TEST	NEET (UG)	2 PM-5:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
6	06\04\2025	MAJOR TEST	NEET (UG) (ALL INDIA OPEN TEST)	2 PM-5:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
7	13\04\2025	MAJOR TEST	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
8	20\04\2025	MAJOR TEST	NEET (UG) (ALL INDIA OPEN TEST)	2 PM-5:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	
9	27\04\2025	MAJOR TEST	NEET (UG)	1 PM-4:20 PM	PEN PAPER	Physics	Full Syllabus
						Chemistry	
						Biology	

ARNING PROGRAMME
: Session : 2024 - 2025)

TEST # 01
13-10-2024

ERIES / JOINT PACKAGE COURSE

ing Students

IT TEST # 01

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.

पढ़ें।
f this Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections**. **Section A** will consist of **35** questions (all questions are mandatory) and **Section B** will have **15** questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

में, अंग्रेजी संस्करण को ही अंतिम माना जाएगा।
uestion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature : ____________

d Rank in Pre-Medical 2025

Dimension and Measurements, Kinematics, Newton's Laws

SECTION - A (PHYSICS)

1. Which of following is correct :-

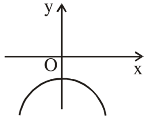
(1) $\sin 8° > \sin 7° > \sin 6°$

(2) $\cos 8° < \cos 7° < \cos 6°$

(3) $\tan 72° > \tan 71° > \tan 70°$

(4) All

2. If $y = -3x^2 - 5$, then graph can be

(1)


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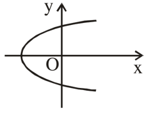

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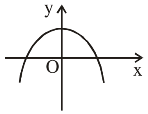

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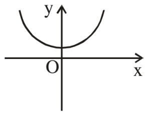


3. $y = e^{-3x} + \log_e x^3 + \sin 2x$; $\frac{dy}{dx}$ = ... ?

(1) $e^{-3x} + \frac{1}{x^3} + \cos 2x$

(2) $3e^{-3x} + \frac{3}{x} + \cos 2x$

(3) $-3e^{-3x} + \frac{3}{x} + 2\cos 2x$

(4) None of these

4. If y = sin 2x – cos 2x then the maximum value of rate of change of y with respect to x is:-

(1) $\sqrt{6}$ (2) $\sqrt{8}$

(3) $\sqrt{20}$ (4) $\sqrt{24}$

5. $\int \left(x^{1/2} + x^{-1} + \pi\right) dx =$

(1) $\frac{1}{2}x^{-\frac{1}{2}} + \ln x + C$

(2) $2x^{\frac{3}{2}} + \ln x + \pi x + C$

(3) $\frac{1}{2}x^{-\frac{1}{2}} - x^{-2} + C$

(4) $\frac{2}{3}x^{\frac{3}{2}} + \ln x + \pi x + C$

6. If $\vec{A} = \vec{B} + \vec{C}$ and the magnitudes of $\vec{A}, \vec{B}$ and $\vec{C}$ are 17, 8 and 15 units respectively. The angle between $\vec{A}$ and $\vec{C}$ is :-

(1) $\cos^{-1}\left(\frac{8}{17}\right)$ (2) $\sin^{-1}\left(\frac{8}{17}\right)$

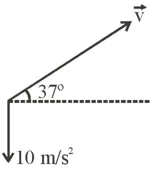
(3) $\cos^{-1}\left(\frac{8}{15}\right)$ (4) $\frac{\pi}{2}$

7. Given that $\vec{P} + \vec{Q} + \vec{R} = \vec{0}$. Which of the following statement is true ?

(1) $|\vec{P}| + |\vec{Q}| = |\vec{R}|$ (2) $|\vec{P} + \vec{Q}| = |\vec{R}|$

(3) $|\vec{P}| - |\vec{Q}| = |\vec{R}|$ (4) $|\vec{P} - \vec{Q}| = |\vec{R}|$

8. Just after firing, a bullet is found to move at an angle of 37° to horizontal. Its acceleration is 10 m/s^2 downwards. Find the component of acceleration in the direction of the velocity.



(1) $-6\ m/s^2$ (2) $-4\ m/s^2$

(3) $-8\ m/s^2$ (4) $-5\ m/s^2$

9. What is the component of $8\hat{i} + 6\hat{j}$ along $\hat{i} + \hat{j}$?

(1) $\frac{7}{2}\left(\hat{i} + \hat{j}\right)$ (2) $7\left(\hat{i} + \hat{j}\right)$

(3) $\frac{5}{2}\left(\hat{i} + \hat{j}\right)$ (4) $5\left(\hat{i} + \hat{j}\right)$

10. **Statement 1 :** Any two vectors $\vec{A}$ and $\vec{B}$, representing any two physical quantities, can be added using the triangle law.

Statement 2 : Vector, by definition, obey the triangle law of addition.

(1) Statement–1 is True, Statement–2 is True ; Statement–2 is a correct explanation for Statement–1.

(2) Statement–1 is True, Statement–2 is True ; Statement–2 is not a correct explanation for Statement–1.

(3) Statement–1 is True, Statement–2 is False.

(4) Statement–1 is False, Statement–2 is True.

11. In a new unit system, the unit of mass is α kg, unit of length is β m and unit of times of γ s. The value of 1J in this new system is :-

(1) $\frac{\gamma^2}{\alpha\beta^2}$ (2) $\frac{\gamma\alpha}{\beta^2}$

(3) $\alpha\beta\gamma$ (4) $\alpha\gamma^2/\beta^2$

12. If dimensions of P and Q are different, then which of the following operation is valid ?

(1) $\frac{P}{Q}$ (2) $e^{-P/Q}$

(3) P – Q (4) P + Q

13. The mass and volume of a body are found to be (5.00 ± 0.05) kg and (1.00 ± 0.05) m^3 respectively. Then the maximum possible percentage error in density :-

(1) 3% (2) 10%

(3) 6% (4) 5%

14. Mark the correct statements for a particle going on a straight line –

(x – position coordinate, v – velocity, a – acceleration)

(1) If x and v have opposite sign, particle moving towards origin

(2) If x and v have same sign particle moving towards origin

(3) If v and a have opposite sign, object is speeding up

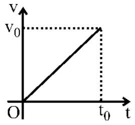
(4) If v is zero, then a is also zero for that particular moment

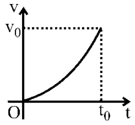
15. A very large number of balls are thrown vertically upwards in quick succession in such a way that the next ball is thrown when the previous one is at the maximum height. If the maximum height is 5 m, the number of ball thrown per minute is (take $g = 10\ ms^{-2}$) :

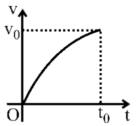
(1) 120 (2) 80

(3) 60 (4) 40

16. The velocity–time graphs of four particles A, B, C and D moving along a straight line are shown as follows :

(A)


(B)


(C)


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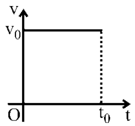


If v_A, v_B, v_C and v_D be the respective average velocities of the four particles, then:

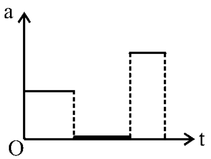
(1) $v_D > v_A > v_B > v_C$

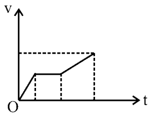
(2) $v_D > v_B > v_A > v_C$

(3) $v_D > v_C > v_A > v_B$

(4) $v_A = v_B = v_C < v_D$

17. Acceleration versus time graph of a body starting from rest is shown in the figure. The velocity versus time graph of the body is given by :-



(1)


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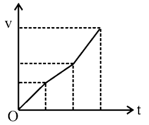

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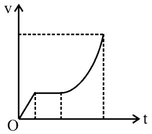

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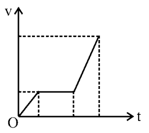


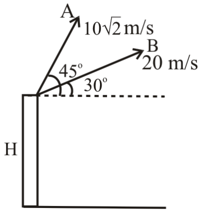
18. Equation of trajectory of a projectile thrown from ground is given as
$2x^2 - 8x + 3y = 0$ (x and y in metre)
If point of projection is origin, range of projectile will be :-

(1) 2 m (2) 4 m (3) 6 m (4) 8 m

19. A particle is projected horizontally with a speed of $20/\sqrt{3}$ m/s, from some height. At what time will its velocity makes 60° angle with initial velocity ?

(1) 1 sec (2) 2 sec (3) 1.5 sec (4) 2.5 sec

20. Two balls are thrown from a tower as shown in the figure:



Which of the ball will hit the ground first?

(1) A

(2) B

(3) Both will strike at the same time

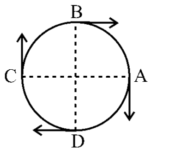
(4) Depends on height of tower

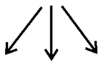
21. An elevator in which a man is standing is moving upwards with a speed of 10 m/sec. If a man drops a coin from a height of 2.45 m, it reaches the floor of the elevator after a time :-

(1) $\sqrt{2}$ sec (2) $\frac{1}{\sqrt{2}}$sec

(3) 2 sec (4) $\frac{1}{2}$sec

22. Four particles A, B, C & D are moving with same speed v as shown in figure. Find out direction of velocity of A with respect to B, C & D at this instant :



(1)


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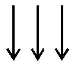

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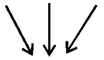

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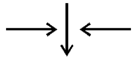
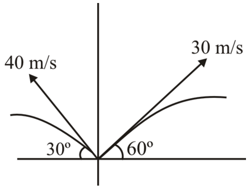


23. Two particles A and B are thrown from same point and in same vertical plane as shown in figure with velocity 30 m/s & 40 m/s as shown in the figure. Find the separation between them after 2 sec :-



(1) 100 m (2) 115 m

(3) 150 m (4) 75 m

24. A river is flowing with speed 4 m/s and a boat having engine speed 72 km/hr crosses the river in minimum time. If river is 400 m wide, then find out drift of the boat :

(1) 20 m (2) 80 m

(3) 90 m (4) 120 m

25. Rain drops are falling with velocity $(2\hat{i} - 4\hat{j})$ m/s. What should be the velocity of a man so that rain drops hit him with speed 5m/s :-

(1) $-\hat{i}$ (2) $5\hat{i}$

(3) $2\hat{i}$ (4) Both 1 and 2

26. **Assertion :** Same force applied for the same time causes the same change in momentum for different bodies.

Reason : The total momentum of an isolated system of interacting bodies remains conserved.

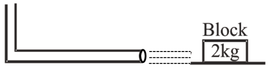
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(3) Assertion is correct, reason is incorrect

(4) Assertion is incorrect, reason is correct.

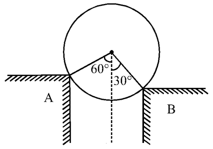
27. A block of metal weighing 2 kg is resting on a frictionless plane. It is struck by a jet releasing water at a rate of 1 kg/s and at a speed of 5 m/s. The initial acceleration of the block is :-



(1) $\frac{5}{3}$m/s^2 (2) $\frac{25}{4}$m/s^2

(3) $\frac{25}{8}$m/s^2 (4) $\frac{5}{2}$m/s^2

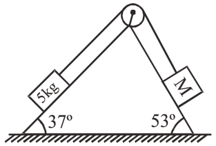
28. A smooth cylinder of mass m and radius R is resting on two corner edges A and B as shown in fig. The relation between normal reaction at the edges A and B is :-



(1) $N_A = \sqrt{2}N_B$ (2) $N_B = \frac{2\sqrt{3}N_A}{5}$

(3) $N_A = \frac{N_B}{2}$ (4) $N_B = \sqrt{3}N_A$

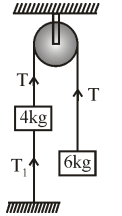
29. For what value of M will the masses be in equilibrium. Masses are placed on fixed wedge:



(1) 5 kg (2) 4 kg

(3) 3.75 kg (4) 3 kg

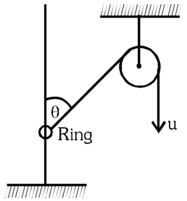
30. Two bodies of mass 4 kg and 6 kg are attached to the ends of a string passing over a pulley. A 4 kg mass is attached to the table top by another string. The tension in this string T_1 is equal to:-



(1) 19.6 N (2) 25 N

(3) 10.6 N (4) 10 N

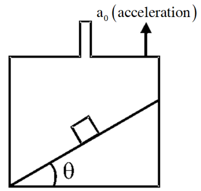
31. Find the speed of the ring as a function of 'θ' if rope is pulled down with constant speed u:-



(1) $\frac{u}{\sin\theta}$ (2) $\frac{u}{\cos\theta}$

(3) $\frac{u}{2\sin\theta}$ (4) $\frac{u}{2\cos\theta}$

32. The acceleration of block with respect to the smooth incline will be -



(1) g sinθ

(2) a_0 sinθ

(3) $(g + a_0)$ sinθ

(4) $(g \sin\theta + a_0 \cos\theta)$

33. A block of mass 100 kg is lying on the surface of a trolley. The coefficient of friction between the surface and the block is 0.7. If acceleration of the trolley is 6 ms^{-2}, the force of friction will be

(1) 420 N (2) 600 N

(3) 700 N (4) None of the above

34. A person sitting in an open car moving at constant velocity throws a coin vertically up . The coin falls (No air friction)

(1) Behind the person

(2) ahead of the person

(3) Out side the car

(4) Exactly in the hand which threw it up

35. A man is standing at the centre of frictionless pond of ice. How can he get himself on shore :-

(1) By throwing his shirt in vertically upward direction

(2) By spitting horizontally

(3) He will wait for the ice to melt in pond

(4) Unable to get at the shore

SECTION - B (PHYSICS)

36. $\vec{A}$ & $\vec{B}$ are unit vectors,
if $(\vec{A}+\vec{B}).(2\vec{A}-3\vec{B}) = -3/2$ then angle between $\vec{A}$ & $\vec{B}$ will be

(1) 30° (2) 60°

(3) 120° (4) None

37. If the three vectors $\vec{A},\vec{B},\vec{C}$ are coplaner then find n = ?

$\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$

$\vec{B} = n\hat{j} - 3\hat{k}$

$\vec{C} = 4\hat{i} + 2\hat{j} + 2\hat{k}$

(1) n = 2 (2) n = 12

(3) n = 3 (4) n = 1

38. The potential energy of a particle varies with distance x as $U = \frac{Ax^{1/2}}{x^2 + B}$, where A and B are constants. The dimensional formula for [AB] is :-

(1) $M^1L^{7/2}T^{-2}$

(2) $M^1L^{11/2}T^{-2}$

(3) $M^1L^{5/2}T^{-2}$

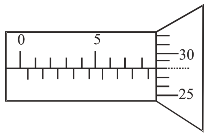
(4) $M^1L^{9/2}T^{-2}$

39. If pressure p, velocity v and time T are taken as fundamental physical quantities, the dimensional formula for the force is :-

(1) $[pv^2T^2]$ (2) $[p^{-1}v^2T^{-2}]$

(3) $[pvT^2]$ (4) $[p^{-1}vT^2]$

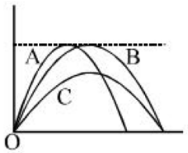
40. Read the screwgauge, if main scale has $\frac{1}{2}$mm marks. Circular scale has 50 divisions and in complete rotation, the screw advances by $\frac{1}{2}$ mm. (no zero error) :-



(1) 8.28 mm (2) 8.78 mm

(3) 17.28 mm (4) 19.28 mm

41. Trajectories are shown in figure for three kicked footballs. Initial vertical & horizontal velocity components are u_y and u_x respectively. Ignoring air resistance, choose the correct statement from **Column-II** for the value of variable in **Column-I**.



Column-I		Column-II	
(A)	time of flight	(P)	greatest for A only
(B)	u_y/u_x	(Q)	greatest for C only
(C)	u_x	(R)	equal for A and B
(D)	$u_x u_y$	(S)	equal for B and C

(1) (A)-S, (B)-R, (C)-P, (D)-Q

(2) (A)-R, (B)-S, (C)-P, (D)-Q

(3) (A)-R, (B)-P, (C)-Q, (D)-S

(4) (A)-R, (B)-S, (C)-Q, (D)-P

42. A body starts moving with a velocity $v_0 = 10\ ms^{-1}$. It experiences a retardation equal to $0.2v^2$. Its velocity after 2s is given by-

(1) +2 ms^{-1} (2) +4 ms^{-1}

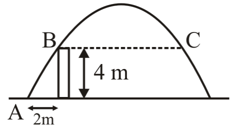
(3) −2 ms^{-1} (4) +6 ms^{-1}

43. A particle moving with uniform acceleration has velocity 6m/s after moving a distance of 5m from the initial position. After moving another 7m, the velocity becomes 8 m/s. The initial velocity and acceleration of the particle are :-

(1) 2 m/s, 4m/s^2 (2) 4 m/s, 2 m/s^2

(3) 4 m/s, 4m/s^2 (4) 6 m/s, 1 m/s^2

44. A particle is projected from point A. A fly is standing at a tower at point B as shown in figure. When particle passes from B, fly starts flying in horizontal direction with constant speed of 2 m/sec. Both will meet at the same horizontal level at point C. Then : ($g = 10\ m/sec^2$) :-



(1) Angle of projection is $\tan^{-1}\left(\frac{9}{2}\right)$

(2) Angle of projection is $\tan^{-1}(2)$

(3) Angle of projection is 45°

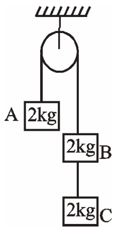
(4) None of these

45. A man slides down a light rope whose breaking strength is η times his weight (η < 1).
What should be his minimum acceleration so that the rope just breaks ?

(1) ηg (2) g(1 − η)

(3) $\frac{g}{1+\eta}$ (4) $\frac{g}{2+\eta}$

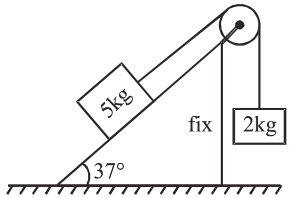
46.



In the system shown in fig. Tension in the string connecting block B and C is :-

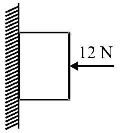
(1) 3.3N (2) 13N (3) 13.3N (4) 19.6N

47. In the arrangement shown in figure coefficient of friction between 5 kg block and incline plane is μ = 0.5. Friction force acting on the 5 kg block is :



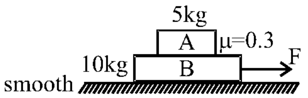
(1) 20 N (2) 15 N (3) 10 N (4) 5 N

48. A block of weight 5N pushed against a vertical wall by a force of 12 N. If μ = 0.8 find the magnitude of force exerted by the wall on the block.



(1) 12 N (2) 13 N (3) 17 N (4) 16 N

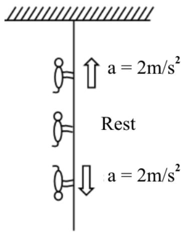
49. The maximum value of F so that there is no slipping between A and B is :-



(1) 35 N (2) 15 N

(3) 100 N (4) 45 N

50. Three monkeys of mass 4kg each are moving on the massless rope as shown. Then the tension at the point on the string connected at the ceiling is : [Take $g = 10\ m/s^2$]



(1) 120 N (2) 128 N

(3) 136 N (4) 112 N

SECTION - A (CHEMISTRY)

51. If n + ℓ = 6, then total possible number of subshells would be :

(1) 3 (2) 4 (3) 2 (4) 5

52. Calculate de-broglie wavelength when an electron is accelerated by 100 volt ?

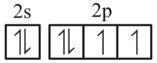
(1) 12.25 Å (2) 1.225 Å

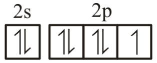
(3) 122.5 Å (4) 1225 Å

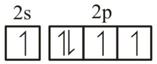
53. Wave number for the longest wavelength transition in the paschen series of atomic hydrogen is :

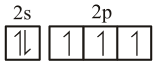
(1) $\frac{144}{7R}$ (2) $\frac{7R}{144}$ (3) $\frac{9}{R}$ (4) $\frac{R}{9}$

54. Which is not in accordance to aufbau principle ?

(1)


(2)


(3)


(4)


55. The total number of electrons in 'Cu' atom having magnetic quantum number (m = 0) will be :-

(1) 8 (2) 10 (3) 12 (4) 13

56. A golf ball has a mass of 50 g and a speed of 100 m/s. If the speed can be measured within accuracy of 2%, then uncertainity in the position is :-

(1) 1.05×10^{-33} m (2) 1.05×10^{-36} m

(3) 5.27×10^{-34} m (4) 5.27×10^{-37} m

57. Which of the following orbitals does not have any nodal plane :-

(1) $3p_z$ (2) 2s (3) $3d_{x^2-y^2}$ (4) $3d_{xy}$

58. The angular momentum of electron in an excited H-atom is $\frac{2h}{\pi}$. The K.E. of electron will be :

(1) + 13.6 eV (2) + 3.4 eV

(3) + 0.85 eV (4) + 0.5 eV

59. The amount of water (g) produced by the combustion of 16g methane.

(1) 9g (2) 36g (3) 18g (4) 2g

60. An organic compound contains 4% sulphur. Its minimum molecular weight is

(1) 200 (2) 400

(3) 800 (4) 1600

61. Number of electrons present in 6g of CO_3^{2-} ion is :

(1) 1.806×10^{24} (2) 1.9264×10^{24}

(3) 3.7324×10^{24} (4) N_A

62. 56 g of N_2 and 10g of H_2 are mixed to produce $NH_3(g)$.
How much NH_3 will be formed in process :
$N_2 + 3H_2 \longrightarrow 2NH_3$

(1) 73 g (2) 56.6 g (3) 14 g (4) 82 g

63. On analysis, a certain compound was found to contain 254 g of iodine (atomic mass 127) and 80 g oxygen (atomic mass 16). What is the formula of the compound ?

(1) IO (2) I_2O (3) I_5O_3 (4) I_2O_5

64. A sample of organic compound consists of 6.023×10^{23} carbon atoms, 1.8069×10^{24} hydrogen atoms and 3.0115×10^{23} oxygen atoms. The right option for the empirical formula of this compound is :-

(1) $C_3H_5O_2$ (2) C_2H_6O

(3) CH_2O (4) CH_3O

65. For the reaction at equilibrium
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g), \Delta H = -Q$
Reaction is favoured in forward direction by :

(1) use of catalyst

(2) decreasing concentration of N_2

(3) low pressure, high temperature and high concentration of ammonia

(4) high pressure, low temperature and higher concentration of H_2

66. For the reaction $2A \rightleftharpoons B + C, K_c = 4 \times 10^{-3}$. At a given time, the composition of reaction mixture is:
$[A] = [B] = [C] = 2 \times 10^{-3}$ M.
Then, which of the following is correct ?

(1) Reaction is at equilibrium.

(2) Reaction has a tendency to go in forward direction.

(3) Reaction has a tendency to go in backward direction.

(4) Reaction has gone to completion in forward direction.

67. Which reaction move in forward direction when following changes are performed at equilibrium ? Match column-I with column-II.

	Column I		Column II
(P)	Volume reduced to half	(A)	$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
(Q)	On addition of He at constant pressure	(B)	$CH_{4(g)} + H_2O_{(g)} \rightleftharpoons CO_{(g)} + 3H_{2(g)}$
(R)	On addition of Cl_2	(C)	$H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$
(S)	On removal of H_2	(D)	$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

(1) P ⟶ D ; Q ⟶ A, B ; R ⟶ C ; S ⟶ B

(2) P ⟶ C ; Q ⟶ B ; R ⟶ A, B ; S ⟶ D

(3) P ⟶ D ; Q ⟶ C ; R ⟶ A ; S ⟶ A, B

(4) P ⟶ A, B ; Q ⟶ C ; R ⟶ D ; S ⟶ A

68. At 527°C, the reaction given below has $K_C = 4$
$A_{(g)} \rightleftharpoons \frac{1}{2}B_{(g)} + \frac{3}{2}C_{(g)}$
what is K_P for the reaction
$B_{(g)} + 3C_{(g)} \rightleftharpoons 2A_{(g)}$

(1) $16 \times (800R)^2$ (2) $\left(\frac{800R}{4}\right)^{-2}$

(3) $\left(\frac{1}{4 \times 800R}\right)^2$ (4) None of these

69. On doubling pressure at constant temperature the equilibrium constant will :-

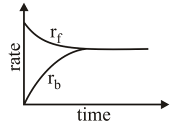
(1) Remain constant

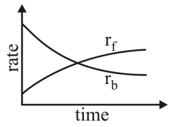
(2) Becomes double

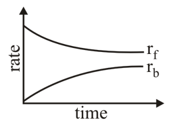
(3) Become one fourth

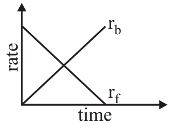
(4) None of these

70. Rate of reaction curve for equilibrium can be like : [r_f = forward rate, r_b = backward rate]

(1) 

(2) 

(3) 

(4) 

71. The equilibrium constant (K_c) for the reaction $HA + B \rightleftharpoons BH^+ + A^-$ is 100.
If the rate constant for the forward reaction is 10^5, then rate constant for the backward reaction is :-

(1) 10^7 (2) 10^3 (3) 10^{-3} (4) 10^{-5}

72. In a 0.25 litre container dissociation of 4 moles of NO takes place. If its degree of dissociation is 10% then K_p for reaction $2NO \rightleftharpoons N_2 + O_2$ is :-

(1) $\frac{1}{(18)^2}$ (2) $\frac{1}{(8)^2}$ (3) $\frac{1}{16}$ (4) $\frac{1}{32}$

73. The solubility product for a salt of the type AB_3 is 2.7×10^{-15}. What is the molarity of its saturated solution ?

(1) 1×10^{-8} (2) 1×10^{-16}

(3) 1×10^{-2} (4) 1×10^{-4}

74. The ratio of solubility of AgCl in 0.1 M KCl solution to the solubility of AgCl in water is :
(Given : Solubility product of AgCl = 10^{-10})

(1) 10^{-4} (2) 10^{-6}

(3) 10^{-9} (4) 10^{-5}

75. Dissociation constant of a weak acid HX at 25°C is 10^{-4}, then pH of 0.01 M solution of its sodium salt is :

(1) 3 (2) 8 (3) 10 (4) 13

76. Match the column-I and column-II.

	Column-I (Species)		**Column-II (Conjugate base)**
(a)	HCO_3^-	(p)	OH^-
(b)	H_2O	(q)	SO_4^{2-}
(c)	NH_3	(r)	CO_3^{2-}
(d)	HSO_4^-	(s)	NH_2^-

Correct match is :

(1) a⟶s, b⟶p, c⟶r, d⟶q

(2) a⟶r, b⟶p, c⟶s, d⟶q

(3) a⟶r, b⟶p, c⟶q, d⟶s

(4) a⟶r, b⟶q, c⟶s, d⟶p

77. In which of the following case silver chloride is most soluble ?

(1) 0.1 M $AgNO_3$ solution

(2) 0.1 M HCl solution

(3) Water

(4) aqueous NH_3

78. Which of the following will produce a buffer solution when mixed in equal volumes :-

(1) 0.1 M NH_4OH and 0.1 M HCl

(2) 0.05 M NH_4OH and 0.1 M HCl

(3) 0.1 M NH_4OH and 0.05 M HCl

(4) 0.1 M CH_3COONa and 0.1 M NaOH

79. Which of the following has the highest degree of ionisation ?

(1) 1 M NH_3 (2) 0.001 M NH_3

(3) 0.1 M NH_3 (4) 0.0001 M NH_3

80. Which of the following is an example of non-metal displacement reaction?

(1) $Zn(s) + CuSO_4(aq) \longrightarrow Cu(s) + ZnSO_4(aq)$

(2) $5Ca(s) + V_2O_5(s) \longrightarrow 2V(s) + 5CaO(s)$

(3) $2Mg(s) + TiCl_4(\ell) \longrightarrow Ti(s) + 2MgCl_2(s)$

(4) $2Na(s) + 2H_2O(\ell) \longrightarrow 2NaOH\ (aq) + H_2(g)$

81. Bromine undergoes disproportionation in basic medium according to reaction shown below:-
$aBr_2(g) + bOH^-(aq) \longrightarrow cBrO^-(aq) + dBr^-(aq) + eH_2O(l)$
The value of a, b, d, e in the balanced redox reaction are respectively :-

(1) 2, 4, 2 and 1 (2) 1, 4, 2 and 2

(3) 2, 1, 4 and 2 (4) 2, 4, 2 and 2

82. How many moles of sodium sulphite are oxidised by three moles of potassium permanganate in acidic medium

(1) 7.5 (2) 1.5 (3) 4.5 (4) 1.25

83. How many species below show disproportionation reaction ?
Cl^-, Cl_2, H_2O_2, SO_3, SO_4^{-2}, PO_4^{-3}, P_4, Cu_2O, SO_2, MnO_2

(1) 6 (2) 5 (3) 4 (4) 7

84. **Statement I :** In acidic medium MnO_4^- converts into Mn^{+2} ion.
Statement II : In redox titration, $KMnO_4$ act as self indicator.

(1) Only statement I is correct.

(2) Only statement II is correct.

(3) Both statement I and statement II are correct.

(4) Both statement I and statement II are incorrect.

85. Determine the equivalent mass of As_2S_3 in the following reaction
$As_2S_3 + NO_3^- + H^+ \longrightarrow AsO_4^{3-} + SO_4^{2-} + NH_3 + H_2O$

(1) Molar mass / 4 (2) Molar mass / 18

(3) Molar mass / 28 (4) Molar mass / 24

SECTION - B (CHEMISTRY)

86. Given below are two statements:
Statement-I : The energy of n = 2 state in He^+ ion is same as the energy of n = 1 state in H atom.
Statement-II : It is possible to determine simultaneously the exact position and exact momentum of an electron in H atom.
In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is true but **Statement II** is false.

(3) **Statement I** is false but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

87. Which of the following sets does not contain isoelectronic species ?

(1) $PO_4^{-3}, SO_4^{-2}, ClO_4^-$ (2) Na^+, Ne, Mg^{+2}

(3) SO_3^-, CO_3^-, NO_3^- (4) $BO_3^{-3}, CO_3^{-2}, NO_3^-$

88. Molar mass of a compound (X) whose 2.6 mol weighs 312 g is :

(1) 120 g mol^{-1} (2) 60 g mol^{-1}

(3) 811.2 g mol^{-1} (4) 312 g mol^{-1}

89. Match the column I with column II :

	Column I (Amount of substance)		**Column II (Number of oxygen atoms)**
(A)	98 mg H_2SO_4	(P)	2 N_A
(B)	18 mL water (d = 1 g/mL)	(Q)	2×10^{-3} N_A
(C)	60 g NO gas	(R)	4×10^{-3} N_A
(D)	44.8 mL of CO_2 gas at 0.5 atm & 273 K	(S)	N_A

Correct match is :

(1) A ⟶ P, B ⟶ Q, C ⟶ R, D ⟶ S

(2) A ⟶ P, B ⟶ S, C ⟶ R, D ⟶ Q

(3) A ⟶ R, B ⟶ S, C ⟶ P, D ⟶ Q

(4) A ⟶ R, B ⟶ S, C ⟶ Q, D ⟶ P

90. Combustion of 10 moles of CH_4 take place in presence of 21 moles of O_2. The number of moles of excess reactant that remains unreacted after the reaction :

(1) 1 mol O_2 (2) 2 mol O_2

(3) 1 mol CH_4 (4) 2 mol CH_4

91. Which pair of species has the same percentage composition ?

(1) $C_6H_{12}O_6$ and $C_{12}H_{22}O_{11}$

(2) $C_6H_{12}O_6$ and CH_3COOH

(3) C_2H_5OH and CH_3COOH

(4) $C_{12}H_{22}O_{11}$ and $HCOOCH_3$

92. $S^{2-} + S \rightleftharpoons S_2^{2-}$; $K_1 = 12$
$S_2^{2-} + S \rightleftharpoons S_3^{2-}$; $K_2 = 11$
Calculate equilibrium constant for reaction
$S_3^{2-} \rightleftharpoons S^{2-} + 2S$.

(1) 132 (2) 7.58×10^{-3}

(3) 1.09 (4) 0.918

93. The equilibrium constant expression for a gaseous reaction is :

$$K_c = \frac{[NH_3]^4[O_2]^5}{[NO]^4[H_2O]^6}$$

The equilibrium reaction is :

(1) $4NH_3 + 5O_2 \rightleftharpoons 4NO + 6H_2O$

(2) $4NO + 6H_2O \rightleftharpoons 4NH_3 + 5O_2$

(3) $4NO \rightleftharpoons 4NH_3 + 5O_2$

(4) $2NO + 3H_2O \rightleftharpoons 2NH_3 + \frac{5}{2}O_2$

94. What is the pH of the resultant solution when equal volumes of 0.1 M HCl and 0.01M NaOH are mixed

(1) 7 (2) 10 (3) 1.35 (4) 12.65

95. Which of the following is not a pair of Lewis base :-

(1) OH^-, H_2O (2) NH_3, F^-

(3) BCl_3, $AlCl_3$ (4) OH^-, F^-

96. Which of the following salts undergo anionic hydrolysis?

(1) $CuSO_4$ (2) NH_4Cl

(3) $AlCl_3$ (4) K_2CO_3

97. The oxidation states **not** shown by Mn in given reaction is :

$3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$

A. +6 B. +2 C. +4

D. +7 E. +3

Choose the **most appropriate** answer from the options given below :

(1) D and E only

(2) B and D only

(3) A and B only

(4) B and E only

98. The pair of compounds that can work both as an oxidising as well as reducing agent is :
(i) SO_2 (ii) H_3PO_3 (iii) NH_3 (iv) HNO_3

(1) (i) and (iii)

(2) (ii) and (iii)

(3) (i) and (ii)

(4) (iii) and (iv)

99. Oxidation state of all the carbon atoms present in carbon suboxide (C_3O_2) separately is :

(1) 0, +1, +2 (2) +1, +2, +3

(3) +2, 0, +2 (4) +2, 0, –2

100. Which of the following is a false statement ?

(1) Reducing agent is a donor of electrons

(2) Oxidation state of fluorine in all its compounds is –1

(3) In Na_2O_2, oxidation state of oxygen is –2

(4) In S_8, sulphur atom has an oxidation number equal to zero

SECTION - A (BOTANY)

101. Which one of the following structure is responsible for the preservation of fossils of pollen-grain :-

(1) Exine and Intine

(2) Only Exine

(3) Whole pollen grain

(4) Pollen tube

102. In Angiosperm, functional megaspore forms :-

(1) Pollen sac (2) Embryosac

(3) Ovule (4) Endosperm

103. Which of the following statement is incorrect ?

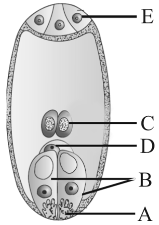
(1) Sporopollenin is one of the most resistant organic material known.

(2) Sporopollenin can withstand high temperatures and strong acids and alkali.

(3) Ornamentations on exine help in taxonomy

(4) Many enzymes are known that degrade sporopollenin.

104.



In the above diagram which of the following is correct function of the corresponding labelling:

(1) D = Formation of primary endosperm

(2) B = Entry of pollen tube in embryosac

(3) E = Secrete chemical substance that attract male gametes

(4) C = Formation of zygote after fusing with one of the male gamete

105. Which of the following seed is endospermic :

(1) Gram (2) Wheat

(3) Pea (4) Ground nut

106. Which of the following type of pollination is functionally cross-pollination but genetically self pollination ?

(1) Autogamy

(2) Geitonogamy

(3) Mesogamy

(4) Xenogamy

107. Which type of pollination usually seen in sea grasses :

(1) Anemophily

(2) Hydrophily

(3) Ornithophily

(4) Entomophily

108. In some plants like coconut and cucurbits, both male and female flowers are present on the same plant that is called monoecious-which prevents:-

(1) Both autogamy and geitonogamy

(2) Geitonogamy but not autogamy

(3) Both geitonogamy and xenogamy

(4) Autogamy but not geitonogamy

109. Nutritive layer of anther is :

(1) *Epidermis* (2) *Tapetum*

(3) *Endothecium* (4) *Exodermis*

110. How many meiosis & mitosis are needed for formation of one mature female gametophyte from megaspore mother cell ?

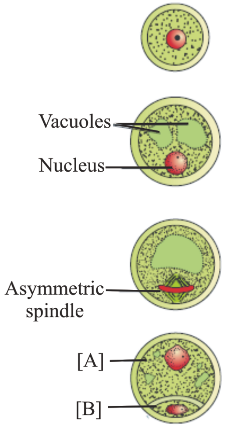
(1) 1 meiosis, 2 mitosis

(2) 2 meiosis, 2 mitosis

(3) 2 meiosis, 3 mitosis

(4) 1 meiosis, 3 mitosis

111. Stages of a microspore maturing into a pollen grain are given in the diagrams. Identify labelled cells [A] and [B] of given diagram :-



(1) [A] Generative cell, [B] Vegetative cell

(2) [A] Generative cell, [B] Tube cell

(3) [A] Vegetative cell, [B] Tube cell

(4) [A] Vegetative cell, [B] Generative cell

112. What is common to *Viola*, *Oxalis* and *Commelina* plants :

(1) All are aquatic plants

(2) All produce cleistogamous flowers

(3) All produce underground chasmogamous flowers

(4) Both (2) and (3)

113. Which of the following is not a water pollinated plant ?

(1) *Zostera* (2) *Vallisneria*

(3) *Hydrilla* (4) *Water lily*

114. How many of the following structure in angiosperm plant have haploid set of chromosomes in cell ?

Microspore, generative cell, synergid, nucellus, integument, antipodal cell, endosperm, zygote, vegetative cell of pollen

(1) Six (2) Eight (3) Five (4) Three

115. Which one of the following out breeding device is based upon genetic mechanism ?

(1) Cleistogamy

(2) Dioecy

(3) Self sterility

(4) Dichogamy

116. Typical anther of flowering plant is :

(1) Dithecous and tetrasporangiate

(2) Dithecous and bisporangiate

(3) Monothecous and bisporangiate

(4) Monothecous and monosporangiate

117. Well exposed stamens, large feathery stigma, single ovule in each ovary and numerous flowers packed into inflorescence is characteristic feature of –

(1) Entomophily (2) Anemophily

(3) Ornithophily (4) Zoophily

118. Cleistogamous flower produces assured seed, even in the absence of pollinators :-

(1) Because they have fragrance

(2) Because they remain open

(3) Because they are autogamous

(4) Because they are colourful

119. Arrange the following terms in the correct development sequence :-

(A) Microspore tetrad (B) Pollen mother cell

(C) Pollen grain (D) Sporogenous tissue

(E) Male gametes

Option

(1) B, D, C, A, E

(2) D, B, A, C, E

(3) D, B, C, A, E

(4) B, D, A, E, C

120. Consider the following five statements (a-e) and select the option which includes all the correct ones only :-

(a) Vegetative cell is bigger, has abundant food reserve and a large irregularly shaped nucleus.

(b) Over 60 percent of angiosperms, pollengrains are shed at 3-celled stage.

(c) Pollen grains many species can be stored for years in liquid nitrogen (−196°C).

(d) Members of Rosaceae, Leguminosae and Solanaceae the pollen grains are viable for months.

(e) Pollen grains are poor in nutrients.

(1) a, b, c, d

(2) a, c, d

(3) b, c, d

(4) a, c, d, e

121. In some plants, pollen grains are shed at two celled condition. In such plants, the generative cell divides mitotically and forms..........during the growth of pollen tube on the stigma.

(1) Vegetative cell & male gamete

(2) Two female gametes

(3) One male gamete

(4) Two male gametes

122. Post fertilisation events include :-

(a) Endosperm development from PEC

(b) Embryo development from zygote

(c) Maturation of ovule into seed

(d) Maturation of ovary into fruit

(1) Only (a) & (b)

(2) Only (b), (c) & (d)

(3) Only (a), (b) & (c)

(4) All (a), (b), (c) & (d)

123. Match the Column-I with Column-II

Column-I		**Column-II**	
(A)	Funicle	(I)	Mass of cells within ovule with more food
(B)	Hilum	(II)	Basal part of ovule
(C)	Integument	(III)	One or two protective layers of ovule
(D)	Chalaza	(IV)	Region where body of ovule fuses with the funicle
(E)	Nucellus	(V)	Stalk of ovule

(1) A-I, B-II, C-III, D-IV, E-V

(2) A-V, B-IV, C-III, D-II, E-I

(3) A-IV, B-II, C-I, D-III, E-V

(4) A-I, B-III, C-V, D-II, E-IV

124. Read the following four statements (a-d).

(a) In Gram, pea and groundnut, endosperm is completely consumed before seed maturation.

(b) Occasionally in some seeds such as black pepper and beet root, remnants of nucellus persists.

(c) Banana and grapes are false fruits

(d) In Angiosperms, seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise in new areas.

How many is/are correct.

(1) Two (2) Three (3) One (4) Four

125. Production of seeds without fertilisation is called :-

(1) Syngamy

(2) Double fertilisation

(3) Apomixis

(4) Geitonogamy

126. Which of following statements are correct ?

(1) The body of ovule fuses with funicle in the region called chalaza

(2) Polar nuclei are situated in the central cell above the egg apparatus.

(3) Cleistogamous flowers are invariably autogamous

(4) Pollen tube releases the two male gametes in to cytoplasm of egg cell

127. Which of the following is not nutritive ?

(1) Tapetum

(2) Endosperm

(3) Integument

(4) Nucellus

128. The male gametes of angiosperms are :-

(1) Uniflagellate (2) Biflagellate

(3) Non-motile (4) Multiflagellate

129. Match a, b, c and d with i, ii, iii and iv:

(a)	Pollen tablets	(i)	Pollen viability for months
(b)	Rosaceae	(ii)	Pollen Allergy
(c)	Pollen bank	(iii)	Food supplement
(d)	*Parthenium*	(iv)	–196°C

Choose the correct match :

(1) a-i, b-iii, c-ii, d-iv

(2) a-iii, b-iv, c-i, d-ii

(3) a-iii, b-i, c-iv, d-ii

(4) a-ii, b-i, c-iv, d-iii

130. Non endospermic seeds are found in which plant ?

(1) Gram (2) Wheat

(3) Maize (4) Castor

131. In a typical angiospermic plant, mature female gametophyte is :

(1) 7-celled and 8-nucleated

(2) 8-celled and 7-nucleated

(3) 3-celled and 3-nucleated

(4) 8-celled and 8-nucleated

132. Multicarpellary, syncarpous gynoecium is found in :-

(1) Rose, lotus

(2) Hibiscus, Papaver

(3) Michelia, lotus

(4) Hibiscus, rose

133. Consider the following four statements (a-d) and select option which includes all the correct ones only :-

(a) Anemophillous flowers are either attractive or with fragrance

(b) Wind pollination is quite common in grasses.

(c) Entomophillous flower possess special fragrance and are attractive in colour.

(d) Water hyacinth and water lily pollinated by water.

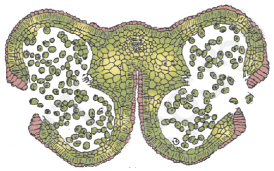
(1) Statement b, c and d

(2) Statement b and d

(3) Statement a, b and c

(4) Statement b and c

134. How many wall layers are found in a pollen sac at following stage.



(1) 2 (2) 3

(3) 4 (4) 1

135.

(a) *Michelia*	(i) One ovule in each ovary
(b) *Papaver*	(ii) Many ovule in each ovary
(c) Papaya	(iii) Mono carpellary
(d) Paddy	(iv) Multicarpellary syncarpous
	(v) Multicarpellary, Apocarpous

Choose the correct match :

(1) a-i, b-ii, c-iii, d-iv (2) a-v, b-iii, c-ii, d-i

(3) a-v, b-iv, c-ii, d-i (4) a-iv, b-v, c-i, d-ii

SECTION - B (BOTANY)

136. Male gametes in angiosperms fuse with :-

(1) Egg cell only

(2) Polar nuclei only

(3) one with egg and another with polar nuclei

(4) Antipodal cells

137. *Parthenium* was introduced in India as contaminant with.

(1) Rice (2) Mango

(3) Wheat (4) Sugarcane

138. Identify the odd one with respect to endosperm from the category

(1) Rice (2) Coconut

(3) Maize (4) Orchid

139. Which of following statement is/are correct

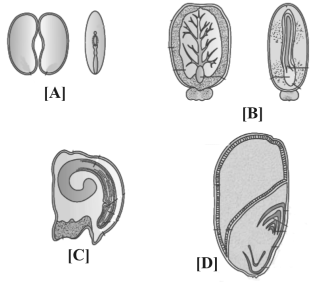
(1) The inner most layer of microsporangium is tapetum & it nourishes the developing pollen grains.

(2) Cells of tapetum generally have more than one nucleus.

(3) Exine of pollen grain has prominent apertures called germ pores.

(4) All the above

140. Which one of the following diagrams represents endospermic dicot seed?



(1) A only

(2) B only

(3) C, D both

(4) A, B both

141. Choose the incorrect match:

(1) Egg cell = Female gamete

(2) Male gamete = Vegetative cell

(3) Ovule = Integumented megasporangium

(4) Microsporangium = pollen sac

142. Angiosperm exhibit double fertilization because-

(1) One fusion events occur in each embryo sac

(2) Two fusion events occur in each embryo sac i.e., syngamy and triple fusion

(3) Fusion of haploid polar nuclei and formed secondary nucleus and male gametes fused with secondary nucleus

(4) Fusion of two male gametes with egg cell.

143. Egg apparatus consist of ?

(1) 1-synergid + 2 egg cell

(2) 1-antipodal + 2 egg cell

(3) 2-synergid + 1 egg cell

(4) 1-synergid + 1 egg cell

144. **Assertion (A) :-** Self incompatibility is a strategy of nature to promote cross-pollination.

Reason (R) :- All cross pollinated plants show self-incompatibility.

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct but **(R)** is the correct explanation of **(A)**

145. **Assertion** :- Wind pollinated flowers often have a single ovule in each ovary.

Reason :- Pollen grain always reach to the stigma in wind pollinated plants.

(1) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

(2) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.

(3) **Assertion** is true but **Reason** is false.

(4) **Assertion** is false but **Reason** is true.

146. **Statement-I:** Geitonogamy is functionally cross pollination and genetically self-pollination.

Statement-II: Geitonogamy involves pollinating agent but pollen grains come from same plant.

(1) Both Statement-I and Statement-II are correct.

(2) Statement-I is correct and Statement-II is incorrect.

(3) Statement-I is incorrect and Statement-II is correct.

(4) Both Statement-I and Statement-II are incorrect.

147. Read the given statements and choose the correct option.

Statement A : Some flower of common pansy do not require pollinators.

Statement B : Geitonogamy is prevented in Castor.

(1) Only A is correct

(2) Both A and B are correct

(3) Only B is correct

(4) Both A and B are incorrect

148. Match the following Column-I and II, select correct option indicating correct match :-

Column-I **Type of pollination**	**Column-II** **Example**
(i) Entomophily	(a) *Zostera*
(ii) Epihydrophily	(b) Maize
(iii) Hypohydrophily	(c) *Yucca*
(iv) Anemophily	(d) *Vallisneria*

(1) i – b, ii – d, iii – c, iv – a

(2) i – c, ii – a, iii – d, iv – b

(3) i – c, ii – d, iii – a, iv – b

(4) i – a, ii – c, iii – d, iv – b

149. Which of the following can be expected if scientists succeed in introducing apomictic gene into hybrid varieties of crops?

(1) Polyembryony will be seen and each seed will produce many plantlets.

(2) Seeds of hybrid plants will show longer dormancy.

(3) Farmers can keep on using the seeds produced by the hybrids to raise new crop year after year.

(4) There will be segregation of the desired characters only in the progeny.

150. Identify the wrong statements regarding post fertilization developement :-

(1) The ovary wall develops into pericarp

(2) The outer integument of the ovule develops into epicarp.

(3) The triple fusion nucleus develops into endosperm

(4) The ovule develops into seed

SECTION - A (ZOOLOGY)

151. The male sex accessory ducts include :-

(1) Rete testis

(2) Vas deferens

(3) Fallopian tubes

(4) Both (1) & (2)

152. The layer which attaches with endometrium of uterus during the process of implantation is :-

(1) Trophoblast

(2) Zona pellucida

(3) Corona Radiata

(4) Embryonal knob

153. **Assertion A :** Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.

Reason R : Colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.

(1) Both A and R are correct and R is the correct explanation of A.

(2) Both A and R are correct but R is NOT the correct explanation of A.

(3) A is correct but R is not correct.

(4) A is not correct but R is correct.

154. The secretory phase in the human menstrual cycle is also called :

(1) Luteal phase and last for about 14 days

(2) Follicular phase and last for about 13 days

(3) Luteal phase and last for about 6 days

(4) Follicular phase and last for about 6 days

155. **Statement-I :** The secondary follicle transforms into a tertiary follicle which is characterised by a fluid filled cavity called antrum.

Statement-II : Graffian follicle ruptures to release the secondary oocyte from the ovary by the process called ovulation.

(1) Both statement-I and statement-II are true.

(2) Both statement-I and statement-II are false.

(3) Statement-I is true and statement-II is false

(4) Statement-I is false and statement-II is true

156. In male penis is covered by loose fold of skin is called:

(1) Foreskin

(2) Urethral meatures

(3) External genitalia

(4) Fimbriae

157. Which of the following statements are correct ?

A. Each testis in human, has above 250 compartments called testicular lobules.

B. The spermatids are transformed into sperms by the process called spermiation.

C. The part of the oviduct closer to the uterus is called infundibulum.

D. The cervical canal along with vagina forms the birth canal.

E. Each spermatogonium is diploid and containes 46-chromosomes.

Select the correct answer from the options given below :

(1) Only A, B and C

(2) Only B, C and D

(3) Only A, C, D

(4) Only A, D, E

158. Find the odd one with respect to number of chromosomes :-

(1) Zygote, spermatogonia, primary spermatocyte

(2) Ovum, polarbody, secondary oocyte

(3) Sperm, smermatid, secondary spermatocyte

(4) Spermatogonia, oogonia, ovum

159. Which of the following statement is incorrect ?

(1) Vigorous coutraction of the uterus at the end of pregnancy causes expulsion of foetus.

(2) Signal for parturition originates from fully developed foetus and placenta.

(3) Foetal ejection reflex triggers release of prolactin from maternal pituitary gland.

(4) After parturition placenta also expells out of uterus.

160. Spermiogenesis involves :-

(1) Formation of secondary spermatocyte from primary spermatocyte.

(2) Formation of spermatids

(3) Formation of sperms from spermatids

(4) Formation of primary spermatocytes.

161. The regions outside the seminiferous tubules called interstitial spaces contains

(1) Small blood vessels

(2) Interstitial cells

(3) Immunological competent cells

(4) All of the above

162. The testis are situated outside the abdominal cavity within a pouch called scrotum, because :

(1) In scrotum, temperature is 2 – 2.5°C lower than the normal internal body temperature.

(2) In scrotum, temperature is 2 – 2.5°C higher than the normal internal body temperature

(3) In scrotum, sperm are get nutrition

(4) Scrotum increase the number of sperms

163. Which hormone is essential for maintenance of the endometrium during pregnancy ?

(1) ADH

(2) Estrogen

(3) Progesterone

(4) Relaxin

164. **Statement-I :** Placenta is connected to the embryo through on umbilical cord which help in the transport of substances to and from the embryo.

Statement-II : During pregnancy estrogens, progestogens and hCG hormones are only secreted by placenta.

(1) Both Statement-I and Statement-II are false.

(2) Statement-I is true and Statement-II is false.

(3) Statement-I is false and Statement-II is true.

(4) Both Statement-I and Statement-II are true.

165. Read the following column-I & column-II & Identify their correct match :

	Column-I		**Column-II**
A.	Milk formation	i.	Estrogen
B.	Ovulation	ii.	Oxytocin
C.	Parturition	iii.	LH
D.	Breast enlargement	iv.	Prolactin
		v.	Androgen

(1) A-v, B-i, C-ii, D-iv

(2) A-ii, B-iv, C-i, D-iii

(3) A-i, B-v, C-iv, D-ii

(4) A-iv, B-iii, C-ii, D-i

166. The signals for parturition originates from :-

(1) Fully developed foetus

(2) Placenta

(3) Both (1) and (2)

(4) Ovary

167. The first movement of the foetus usually observed during.

(1) Fifth month of pregnancy

(2) During second month of pregnancy

(3) During seventh month of pregnancy

(4) During last few month of pregnancy

168. Match the column-I with column-II :-

	Column-I		**Column-II**
(A)	External genitalia	(i)	Mammary gland
(B)	Gametogenesis	(ii)	Ovary
(C)	Lactiferous duct	(iii)	Testes
(D)	Menstruation	(iv)	Hymen
		(v)	Penis
		(vi)	Uterus

(1) A-i,v, B-ii,iii, C-vi, D-iv

(2) A-i,iv,v, B-ii, C-i, D-vi

(3) A-iv,v, B-ii, iii, C-i, D-vi

(4) A-v,vi, B-ii,iii, C-i, D-iv

169. Arrange in a proper sequence the pathway of milk ejection in human female.

A. Mammary duct

B. Nipple

C. Mammary tubule

D. Lactiferous duct

E. Ampulla

F. Alveoli

Choose the correct answer from the option given below :

(1) E ⟶ C ⟶ A ⟶ F ⟶ D ⟶ B

(2) F ⟶ C ⟶ A ⟶ E ⟶ D ⟶ B

(3) F ⟶ E ⟶ A ⟶ C ⟶ D ⟶ B

(4) E ⟶ F ⟶ C ⟶ A ⟶ D ⟶ B

170. Match the following columns and select the correct option-

	Column-I		**Column-II**
(A)	Ovary	(I)	Estrogen
(B)	Fallopian tube	(II)	Ampulla
(C)	Uterus	(III)	Myometrium
(D)	Testes	(IV)	Leydig cells
		(V)	Clitoris

(1) (A–III), (B–II), (C–I), (D–V)

(2) (A–II), (B–I), (C–III), (D–IV)

(3) (A–I), (B–II), (C–III), (D–IV)

(4) (A–III), (B–I), (C–II), (D–IV)

171. For prevention of STDs following simple principle should be followed except

(1) Avoiding sex with multiple/unknown partners

(2) Use of condoms

(3) If STDs is detected one should get isolated from society

(4) The infected person must consult a qualified doctor

172. All require invitro fertilization except :

(1) Test-tube baby procedure

(2) ICSI

(3) GIFT

(4) ZIFT

173. **Assertion (A) :** Presence of menstrual cycle is characteristic of female primates.

Reason (R) : In female primates cyclic changes occurring in uterus, ovary and circulating female hormones are not synchronised.

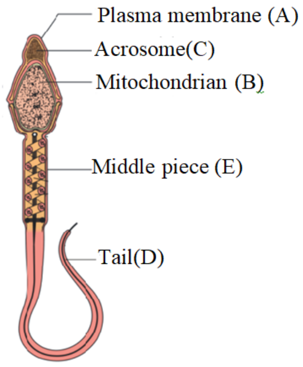
(1) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(2) (A) is correct but (R) is not correct.

(3) (A) is not correct but (R) is correct.

(4) Both (A) and (R) are correct and (R) is the correct explanation of (A).

174. Find incorrect labelling :-



(1) A (2) B (3) C (4) E

175. **Statement-I :** Condoms are disposable, can be self inserted and thereby gives privacy to the user.

Statement-II : Progesterone alone or in combination with estrogen can be used by females as injection or implant under the skin.

(1) Statement I and II both are correct

(2) Statement I and II both are incorrect

(3) Only Statement I is correct

(4) Only Statement II is correct

176. Which hormone is responsible for milk secretion in mammary glands.

(1) Oxytocin

(2) Prolactin

(3) Progesterone

(4) Estrogen

177. HCG is secreted during :-

(1) Pregnancy

(2) Menstrual cycle

(3) Ovulation

(4) Lactation

178. Which of the following statements is not correct ?

(1) Androgens stimulates spermatogenesis

(2) The process of formation of a mature male gamete is called oogenesis.

(3) The secondary follicle soon transforms into a tertiary follicle which is characterised by a fluid filled cavity called antrum.

(4) The functions of male sex accessory ducts and glands are maintained by the testicular hormones.

179. The birth canal of female is formed by :

(1) Uterus

(2) Vagina

(3) Labia majora

(4) Vagina & Cervix

180. Which of the following definition is not correct ?

(1) Gametogenesis : Formation of gametes

(2) Insemination : Transfer of sperm into the female genital tract

(3) Implantation : Attachment of ovum to the uterine wall

(4) Parturition : Delivery of the baby

181. Which of the following statement is NOT correct :

(1) epididymis leads to Vas deferens

(2) Vas deferens ascends to the abdomen and loops over the urinary bladder.

(3) Vas deferens open into seminal vesicle

(4) ejaculatory duct open into urethra

182. Which structure does not carry sperms?

(1) Vas - Deferens

(2) Rete testis

(3) Epididymis

(4) Seminal vesicle

183. **Assertion :** Vasectomy is sterilisation method for female.

Reason : In vasectomy, a small part of the vas deferens is removed.

(1) Assertion & Reason both are correct and Reason is correct explaination of assertion.

(2) Assertion & Reason both are correct and Reason is not correct explaination of assertion.

(3) Assertion is false & reason is correct

(4) Assertion & reasons both are incorrect.

184. Which of the following is primary sexual organ in human being?

(1) Epididymis and uterus

(2) Ovary and uterus

(3) Testis and ovary

(4) Epididymis and ovary

185. Match the column-I with column-II :-

	Column-I		**Column-II**
(A)	Leydig cell	(i)	Interstitial space
(B)	Funnel shaped	(ii)	Membrane of mucus
(C)	paired fold of tissue	(iii)	Blastocyst
(D)	Hymen	(iv)	Infundibulum
		(v)	Labia minora

(1) A-i, B-v, C-iv, D-ii

(2) A-i, B-iii, C-ii, D-v

(3) A-i, B-iv, C-v, D-ii

(4) A-i, B-iv, C-iii, D-v

SECTION - B (ZOOLOGY)

186. Prostate gland occur in.

(1) Males and produces acidic fluid for neutralizing urethral alkalinity

(2) Males and forms part of semen

(3) Females and help in vestibular lubrication

(4) Males and produces androgen for regulating secondary sexual characters.

187. Read the following statements :-

(a) Intentional termination of pregnancy before full term is called medical termination of pregnancy

(b) Nearly 45 to 50 million MTPs are performed in a year all over the India

(c) Government of India legalised MTP in 1977 with some strict conditions to avoid its misuse

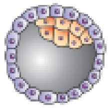
(1) Both (a) and (c) statement are incorrect.

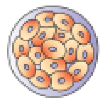
(2) Both (b) and (c) statement are correct.

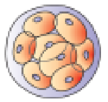
(3) Both (a) and (b) statement are incorrect.

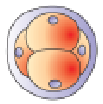
(4) Only (a) statement is correct.

188. In which of the following embryonic stages does the implantation take place.

(1) 

(2) 

(3) 

(4) 

189. Natural methods of birth control include?

(1) Abstinence

(2) Coitus interruptus

(3) Lactation amenorrhoea

(4) All of these

190. The process of delivery of the foetus is called.

(1) Gametogenesis (2) Parturition

(3) Lactation (4) 1 and 2 both

191. Select the correct statements :-

(A) Several mammary tubules join to form a wider mammary ampulla which is connected to lactiferous duct through which milk is sucked out.

(B) The spermatids are transformed into spermatozoa by the process called spermiation.

(C) FSH act at the leydig cells and stimulates synthesis and secretion of androgens.

(D) Sertoli cells secrete some factors which help in the process of spermiogenesis

Choose the correct option :-

(1) A and B (2) Only A

(3) A and D (4) Only D

192. Match the Column-I with Column-II & choose the correct option.

Column-I		Column-II	
(A)	2 to 3 cm	(P)	Leydig cells
(B)	Androgen	(Q)	Male germ cells
(C)	Rete testis	(R)	Width of testis
(D)	Spermatogenesis	(S)	Accessory duct

(1) A – P, B – Q, C – R, D – S

(2) A – S, B – Q, C – R, D – A

(3) A – R, B – P, C – S, D – Q

(4) A – Q, B – P, C – S, D – R

193. The first sign of growing foetus may be noticed by:-

(1) Movement of fetus

(2) Appearance of hair on head

(3) Listening to the heart sound carefully through the stethoscope

(4) Formation of limbs

194. At the time of ovulation, development of ovum is arrested in the form of:-

(1) Oogonia

(2) Primary oocyte

(3) Secondary oocyte

(4) PGC

195. Outer layer of blastocyst is called :

(1) Inner cell mass (2) Trophoblast

(3) Blastomere (4) Amnion

196. Arrange in a proper sequence the pathway of sperms from testis to outside in human male reproductive system.

A. Vas deferens B. Rete testis
C. Seminiferous tubules D. Vasa efferentia
E. Urethra F. Epididymis

Choose the **correct** answer from the option given below:

(1) C ⟶ A ⟶ B ⟶ D ⟶ F ⟶ E

(2) B ⟶ A ⟶ D ⟶ C ⟶ F ⟶ E

(3) C ⟶ B ⟶ D ⟶ F ⟶ A ⟶ E

(4) F ⟶ A ⟶ B ⟶ D ⟶ E ⟶ C

197. Select the correct statement regarding oviduct :-

(1) Each fallopian tube is about 10-12 cm long.

(2) Fimbraie helps in collection of ovum after ovulation.

(3) The widest part of oviduct is ampulla.

(4) All of the above

198. Select the correct statement regarding penis :-

(1) It is a male external genitalia.

(2) The enlarged end of penis called glans penis.

(3) Penis is covered by loose fold of skin called foreskin.

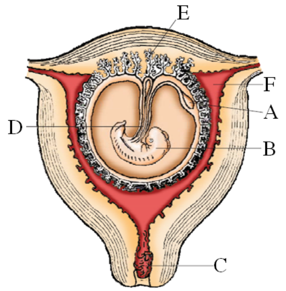
(4) All of the above

199. Which of the following structures is site of fertilisation ?

(1) Vagina (2) Fimbriae

(3) Ampulla (4) Isthmus

200. In the following figure, which region indicates location of placenta ?



(1) A (2) D & E

(3) E (4) E & F

ERIES / JOINT PACKAGE COURSE

ing Students

IIT TEST # 02

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.

पढ़ें।
f this Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections**. **Section A** will consist of **35** questions (all questions are mandatory) and **Section B** will have **15** questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

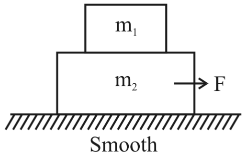
में, अंग्रेजी संस्करण को ही अंतिम माना जाएगा।
estion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature : ______

d Rank in Pre-Medical 2025

SECTION - A (PHYSICS)

1.



If the two bodies moves together then work done by force of friction on upper block is :-

(1) –ve (2) +ve

(3) zero (4) All may possible

2. A particle is displaced by a force represented as $\vec{F} = \left(x\hat{i} + y\hat{j} + z\hat{k}\right)$ N from point (0, 1, 1)m to (2, 1, 1)m then work done by the force during process ?

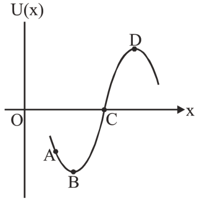
(1) 2 J (2) 4 J (3) 3 J (4) 8 J

3. A particle of mass 2 kg is moving on a rough horizontal surface. If its velocity changes from 20 m/sec to 10 m/sec over a displacement of 30 m then coefficient of friction for the surface is :-

(1) 0.5 (2) 0.2 (3) 0.4 (4) 0.3

4. Potential energy of a particle varies with distance x as shown in the graph

Select the wrong statement :



(1) Rate of change of potential energy with distance is zero at B

(2) Rate of change of potential energy with distance is maximum at C

(3) Position B and D both represents equilibrium

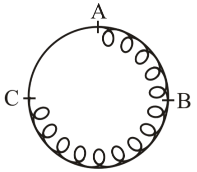
(4) Position D is stable equilibrium

5. The amount of work done in pumping water out of a cubical vessel of height 1 m is (Take g = 10 m/s²)

(1) 5,000 J (2) 10,000 J

(3) 5 J (4) 10 J

6. A spring of natural length AB is extended upto C as shown in figure. If spring constant is k, then energy stored is :- (Radius of circular path = r)



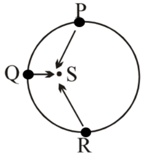
(1) $\frac{\pi^2 kr^2}{8}$ (2) $\frac{\pi^2 r^2 k^2}{4}$ (3) $\frac{\pi^2 r^2 k}{2}$ (4) $\frac{kr^2}{2}$

7. An engine pumps water through a hose pipe water passes through the pipe and leaves it with a velocity of 4 m/s the mass per unit length of water in the pipe is 50 kg/m. What is the power of the engine :-

(1) 4400 W (2) 3200 W

(3) 800 W (4) 200 W

8. An object moves counter-clockwise along the circular path shown below. As it moves along the path its acceleration vector continuously points towards point S. The object



(1) speeds up at P, Q and R

(2) slows down at P, Q and R

(3) speeds up at P and slows down at R.

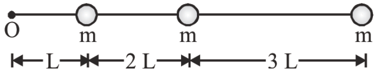
(4) slows down at P and speeds up at R.

9. A car is moving on a circular path of radius r = 150 cm and its speed is increasing at a rate of 8 cm/s^2. At some instant of time its speed is 30 cm/s, the acceleration of the car at this instant is

(1) 14 cm s^{-2} (2) 10 cm s^{-2}

(3) 8 cm s^{-2} (4) 2 cm s^{-2}

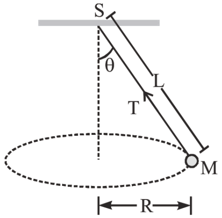
10. Three identical particles are joined together by a thread as shown. All the three particles are moving in circular paths about O in a horizontal plane. The ratio of tensions in the three sections of the string is :-



(1) 3 : 5 : 6 (2) 3 : 4 : 5

(3) 6 : 9 : 10 (4) 7 : 6 : 11

11. A string of length L is fixed at one end and carries a mass M at the other end. The string makes 2/π revolutions per second around the vertical axis through the fixed end as shown in the figure, then tension in the string is :-

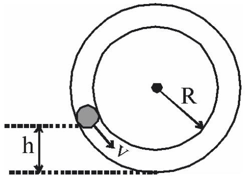


(1) ML (2) 2 ML (3) 4 ML (4) 16 ML

12. A car is travelling at 18 km/hr just rounds a curve without skiding. If the road is plane and the coefficient of friction between the road and the tyres is 0.25. The radius of curve is (g = 10 m/s^2)

(1) 10m (2) 5m (3) 25m (4) 15m

13. With what minimum speed v must a small ball should be pushed inside a smooth vertical tube from a height h so that it may reach the top of the tube? Radius of the tube is R :-



(1) $\sqrt{2g(h+2R)}$ (2) $\frac{5}{2}R$

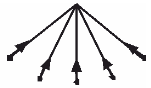
(3) $\sqrt{g(5R+2h)}$ (4) $\sqrt{2g(2R-h)}$

14. A stone tied to a string is rotated in a vertical circle. Speed at bottommost point is $\sqrt{8gR}$, where R is the radius of circle. The ratio of tension at the top and the bottom is :-

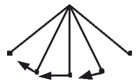
(1) 1 : 2 (2) 1 : 3 (3) 2 : 3 (4) 1 : 4

15. Which of the following figures best illustrates the acceleration of a pendulum bob at different points between two extreme positions?

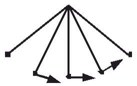
(1)



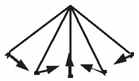
(2)



(3)



(4)



16. ***Assertion (A) :-*** A rocket launched vertically upward explodes at the highest point it reaches. The explosion produces three fragments with non-zero initial velocity. Then the initial velocity vectors of all the three fragments are in one plane.

Reason (R) :- For sum of momentum of three particles to be zero, all the three momentum vectors must be coplanar.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

17. P is the centre of mass of four point masses A, B, C and D, which are coplanar but not collinear.

Statement-I : P may or may not coincide with one of the point masses.

Statement-II : P must lie within the quadilateral ABCD.

(1) Statement-I is true and statement-II is false

(2) Statement-I is false and statement-II is true

(3) Both are true

(4) Both are false

18. A body moving towards a body of finite mass at rest, collides with it. Is it impossible that :

(A) The moving body stops and body at rest starts moving

(B) The stationary body remains stationary and the moving body rebounds

(C) Both bodies come to rest

(D) Both bodies move after collision

(1) Both A and C are correct

(2) Both B and C are correct

(3) Both A and D are correct

(4) Both C and D are correct

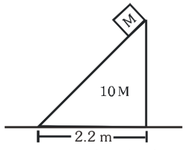
19. A circular disc of radius R is removed from a bigger circular disc of radius 2R such that the circumferences of the discs coincide. The centre of mass of the new disc is αR from the centre of the bigger disc. The value of α is : -

(1) $\frac{1}{3}$ (2) $\frac{1}{2}$ (3) $\frac{1}{6}$ (4) $\frac{1}{4}$

20. The centre of mass of a non uniform rod of length L whose mass per unit length varies as $\rho = \frac{kx^3}{L^2}$ (where k is a constant and x is the distance measured from one end) is at the following distance from the same end.

(1) 3L/4 (2) 4L/5 (3) 2L/3 (4) L/3

21. A block of mass M is placed on the top of a bigger block of mass 10M as shown in figure. All the surfaces are frictionless. The system is released from rest.



Find the distance moved by the bigger block at the instant when the smaller block reaches the ground.

(1) 0.2 m (2) 0.22 m

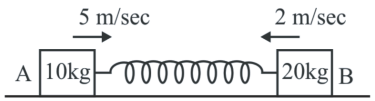
(3) 1.2 m (4) 2.0 m

22. A man of mass 80 kg attempts to jump from the small boat of mass 40 kg on to the shore. He can generate a relative velocity of 6 m/s between him and boat. His velocity towards shore is :-

(1) 2 m/s (2) 3 m/s.

(3) 4 m/s (4) 8 m/s

23. Block A & B are given the velocities 5 m/sec and 2 m/sec as shown which are connected on friction less surface as shown in the diagram. Then at the maximum compression in the spring the velocity (in m/sec) of 10 kg block is :-



(1) 2 (2) $\frac{2}{3}$

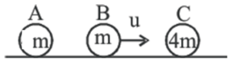
(3) $\frac{1}{3}$ (4) 3.5

24. A ball of mass m approaches a wall of mass M(>> m) with speed 4 m/s along the normal to the wall. The speed of wall is 1 m/s towards the ball. The speed of the ball after an elastic collision with the wall is :-

(1) 5 m/s (2) 9 m/s

(3) 3 m/s (4) 6 m/s

25. Three balls A, B and C are placed on a smooth horizontal surface. Given that $m_A = m_B = m$ and $m_C = 4m$. Ball B collides with ball C with an initial velocity u as shown in figure. All collisions are elastic. The total number of collision between the balls are :



(1) 3 (2) 5 (3) 2 (4) ∞

26. Two balls of equal masses have a head on collision with speed 6 m/s each. If the coefficient of restitution is 1/3, the speed of each ball after impact will be ?

(1) 18 m/s (2) 2 m/s

(3) 6 m/s (4) data insufficient

27. A rigid body can be hinged about any point on it. When it is hinged such that the hinge is at x, the moment of inertia is given by $I(\text{kgm}^2) = 2x^2 - 12x + 27$. The x-coordinate of centre of mass is

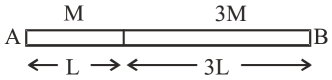
(1) x = 2 m

(2) x = 0 m

(3) x = 1 m

(4) x = 3 m

28. Two thin uniform rods A (M, L) and B (3M, 3L) of same material are joined as shown. Find the moment of inertia about an axis passing through the center of mass of system of rods and perpendicular to the length.



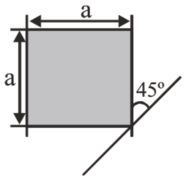
(1) $\frac{4}{3}ML^2$

(2) $\frac{16ML^2}{3}$

(3) $\frac{ML^2}{12}$

(4) $\frac{4ML^2}{5}$

29. The moment of inertia of a thin sheet of mass M of the given shape about the specified axis is (axis and sheet both are in same plane):-



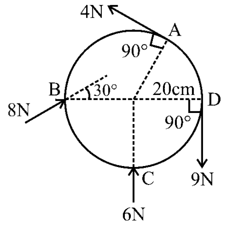
(1) $\frac{7}{12}Ma^2$

(2) $\frac{5}{12}Ma^2$

(3) $\frac{1}{3}Ma^2$

(4) $\frac{1}{12}Ma^2$

30. A wheel of radius 20 cm has forces applied to it as shown in the figure. The net torque produced by the forces is :-



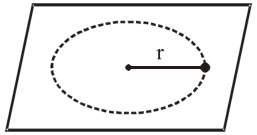
(1) 5.4 N-m (anticlockwise)

(2) 1.8 N-m (clockwise)

(3) 2.0 N-m (clockwise)

(4) 5.4 N-m (clockwise)

31. A small mass attached to a string rotates on a frictionless table top as shown. If the tension in the string is increased by pulling the string causing the radius of the circular motion to decrease by a factor of 2, the kinetic energy of the mass will :-



(1) Decrease by a factor of 2

(2) Remain constant

(3) Increase by a factor of 2

(4) Increase by a factor of 4

32. If radius of earth suddenly contracts to $\frac{1}{n^{th}}$ of its present radius without any change in its mass, the duration of day will approximately become

(1) $\frac{24}{n}$ hour

(2) $\frac{24}{n^2}$ hour

(3) 24 n hour

(4) $24n^2$ hour

33. Which of the following statements is not correct ?

(1) During pure rolling on ground, the instantaneous speed of the point of contact is zero.

(2) During pure rolling on ground, the instantaneous acceleration of the point of contact is zero.

(3) In perfect rolling motion, work done against friction is zero.

(4) A wheel moving down a frictionless inclined plane will slip but not roll on the plane.

34. A body is rolling down on inclined plane. If K.E. of rotation is 40% of K.E. of translatory motion, then the body is a-

(1) Ring

(2) Cylinder

(3) Hollow ball

(4) Solid ball

35. A thin circular ring first slips down a smooth incline then rolls down a rough incline of identical geometry from same height. Ratio of time taken in the two motion is :

(1) $\frac{1}{2}$ (2) 1 (3) $\frac{1}{\sqrt{2}}$ (4) $\frac{1}{4}$

SECTION - B (PHYSICS)

36. A particle moves in a straight line with retardation proportional to its displacement. Its loss of kinetic energy for any displacement x is proportional to-

(1) x^2 (2) e^x

(3) x (4) $\log_e x$

37. Which of the following forces is not conservative?

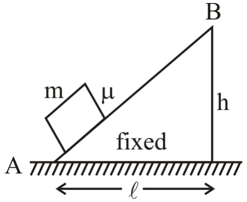
(1) $\vec{F} = 3\hat{i} + 4\hat{j}$

(2) $\vec{F} = 3x\hat{i} + 4y\hat{j}$

(3) $\vec{F} = 3y\hat{i} + 4x\hat{j}$

(4) $\vec{F} = 3x^2\hat{i} + 4y^2\hat{j}$

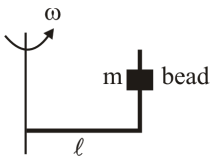
38. Amount of work done to carry a block slowly from A to B will be (Assume friction coefficient μ)



(1) mgh (2) $\mu mg\sqrt{\ell^2 + h^2}$

(3) $\mu mg(\ell + h)$ (4) $mg(h + \mu\ell)$

39. An L shaped rod whose one rod is horizontal and other is vertical is rotating about a vertical axis as shown with angular speed ω. The bead shown in figure has mass m and friction coefficient between rod and bead is μ. The minimum angular speed ω for which sleeve cannot sleep on rod is-



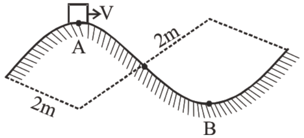
(1) $\omega = \sqrt{\frac{g}{\mu\ell}}$

(2) $\omega = \sqrt{\frac{\mu g}{\ell}}$

(3) $\omega = \sqrt{\frac{\ell}{\mu g}}$

(4) None of these

40.

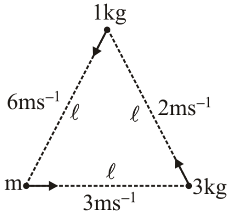


If a block of mass 100 kg passes from point A and B with same speed and it is found that difference between normal reactions at point B and point A is 400 N then find speed of block at point B.

(1) 2 m/s (2) 4 m/s

(3) 20 m/s (4) None of these

41. Three particles of masses 1kg, m (kg) and 3kg situated at the corners of an equilateral triangle are moving at speed 6 ms^{-1}, 3ms^{-1} and 2ms^{-1} respectively. Each particle maintains a direction towards the next corner. If the velocity of centre of mass of the system at this instant is zero then find the value of m.



(1) 1 kg (2) 2 kg (3) 3 kg (4) 4 kg

42. A bullet of mass m hits a target of mass M hanging by a string and gets embedded in it. If the block rises to a height h as a result of this collision, the velocity of the bullet before collision is :-

(1) $v = \sqrt{2gh}$

(2) $v = \sqrt{2gh}\left[1 + \frac{m}{M}\right]$

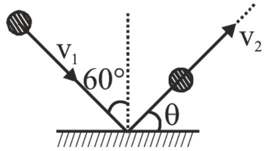
(3) $v = \sqrt{2gh}\left[1 + \frac{M}{m}\right]$

(4) $v = \sqrt{2gh}\left[1 - \frac{m}{M}\right]$

43. A body of mass m moving with velocity v makes a head on perfectly inelastic collision with another body of mass 2m which is initially at rest. Then percentage loss in the kinetic energy :-

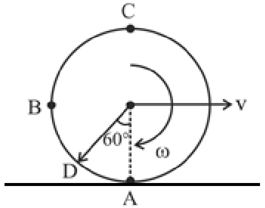
(1) 50% (2) $\frac{200}{3}$% (3) $\frac{800}{3}$% (4) 25%

44. The collision of a ball with the ground is shown in figure. If e = 1/2, then find tan θ



(1) $\frac{1}{2\sqrt{3}}$ (2) $\frac{2}{\sqrt{3}}$ (3) $2\sqrt{3}$ (4) $\sqrt{3}$

45. A rigid body is rolling without slipping on the horizontal surface.



Column - I		Column - II	
A.	Velocity at point A i.e. V_A	1.	$v\sqrt{2}$
B.	Velocity at point B i.e. V_B	2.	Zero
C.	Velocity at point C i.e. V_C	3.	v
D.	Velocity at point D i.e. V_D	4.	2v

	A	B	C	D
(1)	2	1	4	3
(2)	1	3	4	2
(3)	4	3	2	1
(4)	2	1	4	1

46. Three uniform rods, each of mass 'M' and length 'L' form the sides of an equilateral triangle. Moment of inertia of this system about an axis passing through a corner and perpendicular to the plane of triangle is :-

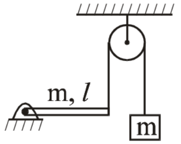
(1) $\frac{5}{2}ML^2$

(2) $\frac{3}{2}ML^2$

(3) $\frac{7}{2}ML^2$

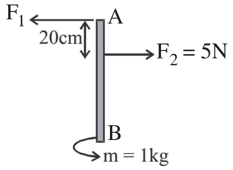
(4) ML^2

47. Uniform rod AB is hinged at end A in horizontal position as shown in the figure. The other end is connected to a block through a massless string as shown. The pulley is smooth and massless. Masses of block and rod is same and is equal to m. Then acceleration of block just after release from this position is



(1) 6g/13 (2) g/4 (3) 3g/8 (4) None

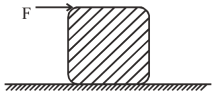
48. A thin uniform rod AB of mass 1 kg moves translationally towards right with acceleration $2 m/s^2$ due to two antiparallel forces F_1 and F_2 as shown. Find the length of the rod :-



(1) 50 cm (2) 200 cm

(3) 150 cm (4) 100 cm

49. A force F is applied on the top of a cube as shown in figure. The coefficient of friction between the cube and the ground is μ. If F is gradually increased, the cube will topple before sliding if :-



(1) $\mu > 1$ (2) $\mu < \frac{1}{2}$ (3) $\mu > \frac{1}{2}$ (4) $\mu < 1$

50. A thin rod of length L and mass M is held vertically with one end on the floor and is allowed to fall. Find the velocity of the other end when it hits the floor, assuming that the end on the floor does not slip:

(1) $\sqrt{\frac{3g}{L}}$ (2) $\sqrt{3gL}$

(3) $\sqrt{\frac{L}{3g}}$ (4) $\sqrt{\frac{g}{3L}}$

SECTION - A (CHEMISTRY)

51. Consider the reaction : $2N_2O_4 \longrightarrow 4NO_2$

If $\frac{-d[N_2O_4]}{dt} = k[N_2O_4]^2$ and $\frac{d[NO_2]}{dt} = k'[N_2O_4]^2$ then

(1) 2k' = k (2) k' = 2k

(3) k' = k (4) $k = \frac{1}{4}k'$

52. Consider the reaction, $2N_2O_5 \longrightarrow 4NO_2 + O_2$. In the reaction NO_2 is being formed at the rate of 0.0125 mol $L^{-1} s^{-1}$. What is the rate of reaction at this time?

(1) 0.0018 mol $L^{-1} s^{-1}$ (2) 0.0031 mol $L^{-1} s^{-1}$

(3) 0.0041 mol $L^{-1} s^{-1}$ (4) 0.050 mol $L^{-1} s^{-1}$

53. **Statement-I :** In the reaction $N_2 + 3H_2 \longrightarrow 2NH_3$, the value of rate of reaction is different in terms of N_2, H_2 and NH_3.

Statement-II : Rate of reaction may be equal to the rate of disappearance of a reactant or rate of formation of a product.

(1) Both **Statement I** and **Statement II** are true

(2) **Statement I** is true but **Statement II** is false

(3) **Statement I** is false but **Statement II** is true

(4) Both **Statement I** and **Statement II** are false

54. Match the rate law given in column I with the dimensions of rate constants given in column II and mark the appropriate choice. :-

	Column-I		Column-II
(A)	Rate = $k[NH_3]^0$	(i)	mol $L^{-1} s^{-1}$
(B)	Rate = $k[H_2O_2][I^-]$	(ii)	L $mol^{-1} s^{-1}$
(C)	Rate = $k[CH_3CHO]^{3/2}$	(iii)	s^{-1}
(D)	Rate = $k[C_2H_5Cl]$	(iv)	$L^{1/2} mol^{-1/2} s^{-1}$

(1) (A) → (iv), (B) → (iii), (C) → (ii), (D) → (i)

(2) (A) → (i), (B) → (ii), (C) → (iii), (D) → (iv)

(3) (A) → (ii), (B) → (i), (C) → (iv), (D) → (iii)

(4) (A) → (i), (B) → (ii), (C) → (iv), (D) → (iii)

55. For the reaction A + B ⟶ C; starting with different initial concentration of A and B, initial rate of reaction were determined emperimentally in four experiments.

	$[A]_0$/M (Initial conc.)	$[B]_0$/M (Initial conc.)	rate/(M sec^{-1})
1.	1.6×10^{-3}	5×10^{-2}	10^{-3}
2.	3.2×10^{-3}	5×10^{-2}	4×10^{-3}
3.	1.6×10^{-3}	10^{-1}	2×10^{-3}
4.	3.2×10^{-3}	10^{-1}	8×10^{-3}

Rate law for reaction from above data is :-

(1) $r = k[A]^2 [B]^2$ (2) $r = k[A]^2 [B]$

(3) $r = k[A] [B]^2$ (4) $r = k[A] [B]$

56. The rate constant of the reaction, $2H_2O_2 \longrightarrow 2H_2O + O_2$ is 3×10^{-3} min^{-1}. At what concentration of H_2O_2, the rate of reaction will be 2×10^{-4} Ms^{-1} ?

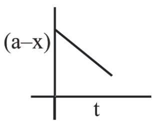
(1) 6.67×10^{-3} M (2) 4 M

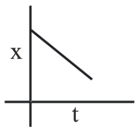
(3) 0.08 M (4) 2 M

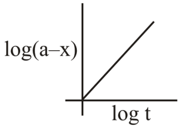
57. Which of the following curves represents a zero order reaction :

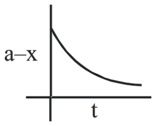
(a−x) ⟶ Remaining conc. of reactant

x ⟶ Conc. of product

(1)


(2)


(3)


(4)


58. Rate constant of a first order reaction is 0.0693 min^{-1}. Calculate time taken if we start with 20 mol L^{-1} concentration of reactant and it is reduced to 2.5 mol L^{-1} :-

(1) 10 min (2) 20 min (3) 30 min (4) 40 min

59. Which of the following relation is correct for I^{st} order reaction

(1) $t_{1/2} = \frac{\log(2)}{k}$ (2) $t_{100\%} = 2 \times t_{50\%}$

(3) $t_{87.5\%} = 3 \times t_{75\%}$ (4) $\frac{t_{87.5\%}}{t_{75\%}} = \frac{3}{2}$

60. The rate of a first order reaction is 3×10^{-4} mol $L^{-1} s^{-1}$ at 25 minutes and 2×10^{-4} mol $L^{-1} s^{-1}$ at 75 minutes after initiation. Find the half life of the reaction. [log3 = 0.48, log2 = 0.3]

(1) $\frac{250}{3}$ min (2) $\frac{200}{3}$ min

(3) 60 min (4) 90 min

61. For the reaction A ⟶ product, the half life is 30 seconds at initial concentration of 5 mole/litre and it becomes 2 minutes when initial concentration becomes 2.5 mole/litre then order of reaction is :-

(1) 0 (2) 1 (3) 2 (4) 3

62. Which of the following curve is a straight line graph with non-zero slope.

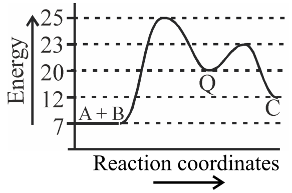
(1) $t_{1/2}$ v/s $[A]_0$ for 1^{st} order reaction

(2) log $[A]_t$ v/s t for I^{st} order reaction

(3) $t_{1/2}$ v/s $[A_0]$ for second order reaction

(4) $[A_t]$ v/s t for first order reaction

63. For a multistep reaction such as A + B ⟶ Q ⟶ C; the potential energy diagram is shown below. What is E_a for the reaction Q ⟶ C?



(1) 3 kcal mol^{-1}

(2) 5 kcal mol^{-1}

(3) 8 kcal mol^{-1}

(4) 11 kcal mol^{-1}

64. For $N_2 + 3H_2 \longrightarrow 2NH_3 + 22$ kcal.
E_a (Energy of activation) is 70 kcal.
Hence E_a for $2NH_3 \longrightarrow N_2 + 3H_2$ is :-

(1) 92 kcal (2) 70 kcal

(3) 48 kcal (4) 22 kcal

65. In a zero order reaction, for every 10°C rise in temperature, the rate is doubled. If temperature rises from 30°C to 80°C, the rate of reaction will be –

(1) 8 times (2) 32 times

(3) 64 times (4) 256 times

66. Mark the incorrect statements:
(a) Catalyst provides an alternative pathway to reaction mechanism
(b) Catalyst raises the activation energy
(c) Catalyst lowers the activation energy
(d) Catalyst alters enthalpy change of the reaction

(1) b, d (2) a, c (3) b, c (4) a, d

67. The rate of reaction can be increased by :

(1) Increasing the temperature

(2) Increasing the activation energy

(3) Decreasing the concentration of reactants

(4) All of these

68. If $\ell nk = 6 - \frac{2000}{T}$, E_a (in kcal/mol) is-

(1) 4 kcal / mol (2) 1 kcal / mol

(3) 6 kcal / mol (4) 8 kcal / mol

69. Decrease of which term in the equation,
$k = PZ\,e^{-Ea/RT}$ would result into a faster reaction?

(1) E_a (2) T (3) Z (4) P

70. The amount of glucose required to prepare 250 mL of $\frac{M}{20}$ aqueous solution is :
(Molar mass of glucose : 180 g mol^{-1})

(1) 2.25 g (2) 4.5 g

(3) 0.44 g (4) 1.125 g

71. If mole fraction of solute in it's aqueous solution is 0.1 then it's molality is ?

(1) 6.17 m (2) 55.5 m

(3) 5.5 m (4) 0.6 m

72. The molarity of 6% (w/V) urea (NH_2CONH_2) solution is :

(1) 0.1 M (2) 0.5 M (3) 0.2 M (4) 1 M

73. 5m NaOH solution has the density 0.6 g/mL. Molarity of solution will be :-

(1) 5 M (2) 2.5 M

(3) 0.25 M (4) 2.7 M

74. The volume strength of 1.5 N H_2O_2 solution is :-

(1) 4.2 (2) 7.4 (3) 8.4 (4) 9.8

75. The correct option for the value of vapour pressure of a solution at 45°C with benzene to octane in molar ratio 3 : 2 is :
[At 45°C, vapour pressure of benzene is 280 mm of Hg and that of octane is 420 mm of Hg. Assume Ideal solution]

(1) 160 mm of Hg (2) 168 mm of Hg

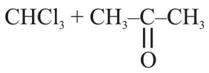
(3) 336 mm of Hg (4) 350 mm of Hg

76. Which of the following pair shows a positive deviation from Raoult's law :-

(1) $H_2O + HNO_3$

(2) Benzene + methanol

(3) $H_2O + HCl$

(4)

$CHCl_3 + CH_3\text{–}\underset{\underset{O}{\|}}{C}\text{–}CH_3$

77. If 30 mL chloroform and 50 mL Acetone are mixed to form a non ideal solution, then volume of the solution is ......

(1) > 80 mL (2) < 80 mL

(3) = 80 mL (4) ≥ 80 mL

78. At 80°C vapour pressure of pure benzene is 750mm Hg. At this temperature vapour pressure is lowered by 10 mm Hg on dissolving 2g non-volatile solute in 156g benzene then molar mass of solute is :-

(1) 148 (2) 74 (3) 296 (4) 370

79. If 0.5 g of a solute (molar mass 100 g mol^{-1}) in 25 g of solvent elevates the boiling point by 1 K, the molal elevation constant of the solvent is : (in K $kgmol^{-1}$)

(1) 2 (2) 8 (3) 5 (4) 0.5

80. Osmotic pressure of 0.585% (w/V) NaCl solution at 27°C is nearly.

(1) 2.49 atm

(2) 5 atm

(3) 1.2 atm

(4) 3.8 atm

81. The observed and calculated molar mass of $AgNO_3$ are 102 and 170 respectively then degree of dissociation of $AgNO_3$ in solution is :-

(1) 66 % (2) 83.5 %

(3) 48 % (4) 60 %

82. 2 m aqueous solution of an electrolyte X_3Y_2 is 25% ionized. The boiling point of the solution is (K_b for H_2O = 0.52 K kg/mol) :-

(1) 375.08 K

(2) 394.04 K

(3) 405.2 K

(4) 390.2 K

83. What is the freezing point of a solution containing 8.1 g of HBr in 100g water assuming the acid to be 90% ionised (K_f for water = 1.86 K $molality^{-1}$)

(1) 0.85°C (2) −3.53°C

(3) 0°C (4) −0.35°C

84. 10% (w/V) solution of urea is isotonic with 6% (w/V) solution of a non-volatile non-electrolyte solute X. What is the molecular mass of solute X ?

(1) 6 g mol^{-1} (2) 60 g mol^{-1}

(3) 36 g mol^{-1} (4) 32 g mol^{-1}

85. Arrange following 0.1 m aqueous solutions in decreasing order of their vapour pressure :-
(a) $AlCl_3$ (33.33% dissociated)
(b) $K_4[Fe(CN)_6]$ (25% dissociated)
(c) $CaCl_2$ (50% dissociated)

(1) c > a > b

(2) a > b > c

(3) b > c > a

(4) All have same vapour pressure

SECTION - B (CHEMISTRY)

86. **Assertion (A) :-** For reaction $A + B \longrightarrow C$ having rate law; r = k[A]. The rate remains unchanged when concentration of B is doubled.
Reason (R) :- Order with respect to A is one.

(1) Both (A) and (R) are correct

(2) (A) is correct but (R) is not correct

(3) (A) is incorrect but (R) is correct

(4) Both (A) and (R) are incorrect

87. What will be the rate law of a complex reaction
$P + 2Q + R \longrightarrow$ product
which have following mechanism ?
Step(I) $P + Q \rightleftharpoons A$ (fast)
Step(II) $A + R \longrightarrow B$ (slow)
Step(III) $B + Q \longrightarrow$ Product (fast)

(1) Rate = k[P][Q]

(2) Rate = $k[P]^2[Q][R]^3$

(3) Rate = $k[P]^{1/2}[Q]\,[R]^{1/3}$

(4) Rate = k[P][Q][R]

88. Match the following :

	Column-I		Column-II
(I)	$NH_4NO_2 \longrightarrow N_2 + 2H_2O$	(P)	Trimolecular reaction
(II)	$2HI \longrightarrow H_2 + I_2$	(Q)	Unimolecular reaction
(III)	$2NO + O_2 \longrightarrow 2NO_2$	(R)	Complex reaction
(IV)	$KClO_3 + 6FeSO_4 + 3H_2SO_4 \longrightarrow KCl + 3Fe_2(SO_4)_3 + 3H_2O$	(S)	Bimolecular reaction

Correct match is:

(1) I-Q, II-S, III-R, IV-P

(2) I-R, II-P, III-S, IV-Q

(3) I-Q, II-S, III-P, IV-R

(4) I-S, II-Q, III-P, IV-R

89. The decomposition of azomethane at certain temperature according to the equation $(CH_3)_2N_2 \longrightarrow C_2H_6 + N_2$ is a first order reaction. Initial pressure of azomethane is 200 mm of Hg then. After 40 minutes from the start the total pressure developed is found to be 350 mm of Hg. The value of rate constant k is :-

(1) $2.88 \times 10^{-4}\ s^{-1}$

(2) $1.25 \times 10^{-4}\ s^{-1}$

(3) $5.77 \times 10^{-4}\ s^{-1}$

(4) $5.77 \times 10^{-2}\ s^{-1}$

90. What is the activation energy of a reaction if its rate becomes 4 times when the temperature is raised from 27°C to 47°C ?
[Given : R = 8.314 J/mol K]

(1) 24.2 kJ mol^{-1} (2) 55.3 kJ mol^{-1}

(3) 96.5 kJ mol^{-1} (4) 147 kJ mol^{-1}

91. The activation energy of the reaction at a given temperature is found to be 2.303RT J mol^{-1}. The ratio of rate constant to the Arrhenius factor at same temperature is :

(1) 0.01 (2) 0.1

(3) 0.02 (4) 0.001

92. Calculate normality of 2.1% (w/V) H_2SO_4 solution?

(1) 2.14 N

(2) 4.28 N

(3) 0.428 N

(4) 0.214 N

93. K_H value for Ar(g), $CO_2(g)$, $N_2(g)$ and $CH_4(g)$ at the same temperature are 40.39, 1.67, 76.86 and 0.413 k bar respectively. The increasing order of their solubility is :

(1) $CH_4(g) < CO_2(g) < Ar(g) < N_2(g)$

(2) $N_2(g) < CO_2(g) < Ar(g) < CH_4(g)$

(3) $N_2(g) < Ar(g) < CO_2(g) < CH_4(g)$

(4) $Ar(g) < N_2(g) < CH_4(g) < CO_2(g)$

94. Select incorrect statement :-

(1) The tanks used by scuba divers are filled with air diluted with helium.

(2) At high altitudes, the partial pressure of oxygen is less than of the ground level.

(3) Low blood oxygen in people causes a condition known as anoxia

(4) Formation of bubbles of oxygen in the blood creates a medical condition known as bends.

95. Which one is incorrect for ideal solutions

(1) $\Delta S_{mix.} = 0$

(2) $\Delta G_{mix.} = 0$

(3) They form azeotropes

(4) All are incorrect

96. Which will form maximum boiling azeotrope ?

(1) $C_6H_6 + C_6H_5CH_3$ solution

(2) $HNO_3 + H_2O$ solution

(3) $C_2H_5OH + H_2O$ solution

(4) n-hexane and n-heptane

97. In the below set up, net flow of solvent from A to B then:-

Solution A | Semipermeable membrane | Solution B

(1) Solution A will be more concentrated relative to solution B

(2) Solution A will be more dilute relative to solution B

(3) Solution A and solution B will be equally concentrated

(4) Solution A will be at higher temperature relative to solution B

98. 8 g of C_6H_5COOH dissolved in 100 g of benzene shows a depression in freezing point equal to 1.62 K. If molal depression constant of benzene is 4.9 K kg mol^{-1}. The percentage association of benzoic acid will be approximately. (Suppose benzoic acid forms dimer in benzene)

(1) 50 % (2) 75 %

(3) 85 % (4) 99 %

99. 0.8M NaCl solution is isotonic with 1M H_3PO_3 solution. Then % dissociation of H_3PO_3 will be -

(1) 80 (2) 60 (3) 30 (4) 20

100. For following aqueous solution the correct order of decreasing freezing point is -

(1) 0.2M $BaCl_2$, 0.2M KCl, 0.1M Na_2SO_4

(2) 0.2M KCl, 0.1M Na_2SO_4, 0.2M $BaCl_2$

(3) 0.1M Na_2SO_4, 0.2M KCl, 0.2M $BaCl_2$

(4) 0.1M Na_2SO_4, 0.2M $BaCl_2$, 0.2M KCl

Molecular Basis Of Inheritance

SECTION - A (BOTANY)

101. Read the all following statements carefully and choose the correct option :-

(a) Phenotype is the external manifestation of gene product

(b) Individuals with similar phenotypes may not belong to same genotype

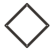
(c) Individuals with different phenotypes always have similar genotypes

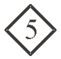
(d) Phenotype is not influenced by environment

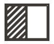
(e) Human height is influenced by environment.

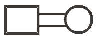
(1) a, b (2) b, e (3) a, e (4) c, d

102. Which symbol of pedigree is correctly matched ?

(1)  – Female

(2)  – affected offspring

(3)  – Affected male of autosomal recessive disease

(4)  – Marriage between relatives

103. Which is incorrect for *Drosophila melanogaster ?*

(1) They could be grown on simple synthetic medium

(2) Single mating could produce a large number of progeny

(3) They complete their life cycle in about 7 weeks

(4) There was a clear differentiation of the sexes.

104. Select the incorrect statement with regard to haemophilia.

(1) It is a dominant disease

(2) A single protein involved in the clotting of blood is affected

(3) It is a sex-linked disease

(4) It is a recessive disease

105. Which of the following is mismatched ?

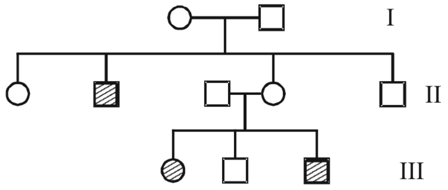
(1) Incomplete dominance – Exception of second postulate of mendel

(2) Co-dominance – Exception of law of purity of gametes

(3) Multiple allele – Population studies

(4) Lethal gene – Changed phenotypic ratio

106. Given below is the pedigree of Sickle cell anaemia in a family :-



In this the genotype of both the parents of generation I will be :-

(1) AA & Aa

(2) AA & aa

(3) Aa and Aa

(4) Aa and aa

107. **Assertion (A) :** The distance between two polynucleotide chains in dsDNA remains constant.
Reason (R) : Always a purine comes opposite to pyrimidine or vice versa.

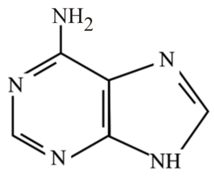
(1) Both A and R are true and R is the correct explanation of A.

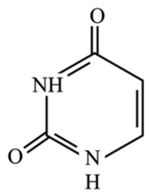
(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false

(4) A is false but R is true

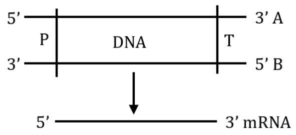
108. Identify the molecules (a) and (b) shown below.


(a)


(b)

	(a)	(b)
(1)	Guanine	Uracil
(2)	Adenine	Uracil
(3)	Uracil	Adenine
(4)	Adenine	Cytosine

109.



Which one should be correctly related with this diagram :
(a) A is Coding strand (b) A is Non coding strand
(c) B is Antisense strand (d) B is Sense strand

(1) a & b

(2) a & c

(3) b & d

(4) b & c

110. During processing of hn-RNA in eukaryotes after transcription, the following event is true :-

(1) In tailing, adenaylate residues are added at 5' end in a template dependent manner

(2) The process of splicing represents the dominance of RNA world

(3) The split gene arrangements represents probably an advanced feature of genome

(4) In prokaryotes RNA polymerase II transcribe hn-RNA

111. Statements :
(A) The four nucleotide bases are not necessarily present in DNA in exact equal proportions.
(B) The total amount of purines is equal to the total amount of pyrimidines in the genetic material of ϕx174 bacteriophage.
(C) DNA ligase enzyme act to hydrolyse or breakdown a polynucleotide chain into its component nucleotides.
(D) Nuclease enzymes are capable of restoring an intact DNA duplex.
Of the above statements :-

(1) A is correct but B, C and D are wrong

(2) A and B are wrong but C and D are correct

(3) A, B and C are correct but D is wrong

(4) A and B are correct but C and D are wrong

112. Consider the following four statements (a-d) and select the option which includes all the correct:-
(a) The codon is read in mRNA in a contiguous fashion.
(b) UAG codon has dual function in protein synthesis.
(c) In actual structure, the tRNA is a compact molecule which looks like inverted 'L'.
(d) 28's' rRNA in bacteria also behave as ribozyme.

(1) b, c and d (2) a, b and d

(3) a, c and d (4) a and c

113. DNA is a long polymer of nucleotides. If in a ds DNA 4000 base pairs are found then what will be the number of nucleotides, sugar molecules, phosphate molecules?

(1) 8000, 4000, 4000

(2) 4000, 4000, 8000

(3) 4000, 8000, 4000

(4) 8000, 8000, 8000

114. In a 4.8 K bases long piece of dsDNA, 1230 guanine bases were found. What would be the number of thymine bases ?

(1) 1170 (2) 2460 (3) 2340 (4) 860

115. DNA replication is :-

(1) Conservative and discontinuous

(2) Semiconservative and semi-discontinuous

(3) Semiconservative and discontinuous

(4) Conservative

116. During replication new DNA strand is synthesized in :-

(1) 5'⟶ 3' Direction from 3'⟶ 5' template

(2) 5'⟶ 3' Direction from 5'⟶ 3' template

(3) 3'⟶ 5' Direction from 5'⟶ 3' template

(4) 3'⟶ 5' Direction from 3'⟶ 5' template

117. The unequivocal proof that DNA is the genetic material by Hershey and Chase. They worked with:-

(1) Viruses (2) Neurospora

(3) Fungi (4) Mouse

118. Which type of RNA molecule act as adapter ?

(1) r-RNA (2) m-RNA

(3) t-RNA (4) Sn-RNA

119. DNA finger printing was invented by :–

(1) Kary Mullis (2) Alec Jeffery

(3) Dr. Paul Berg (4) Francis Collins

120. If the DNA of virus is labelled with 32p and the protein coat of virus is labelled with 35s after transduction which molecule would be present inside bacterial cell ?

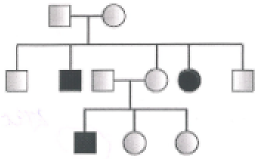
(1) 32 p only

(2) 35 s only

(3) Both 35 s and 32 p

(4) Neither molecule would be present inside the cell.

121. Study the following pedigree analysis and select correct option of related with it :



(1) Autosomal dominant trait

(2) Autosomal recessive trait

(3) Sickle cell anemia trait

(4) 2 & 3 both

122. Mendel performed his famous hybridization experiments on :

(1) Drosophila melanogaster

(2) Pisum sativum

(3) Mirabilis jalapa

(4) Antirrhinum majus

123. The mating of a red fruit bearing tomato plant with yellow fruit bearing plants yeilded 173 plants out of there 84 for red fruits, while 89 for yellow fruits. The genotype of the parents are most likely :

(1) RR, rr

(2) RR, Rr

(3) Rr, rr

(4) rr, rr

124. In Mirabilis jalapa, when homozygous redflowered and white-flowered plants are crossed, all F_1 plants have pink-coloured flowers. In F_2 produced by selfing of F_1 individuals, red, pink and white flowered plants appear respectively in the ratio of :

(1) 1 : 1 : 1 : 1 (2) 1 : 2 : 1

(3) 2 : 1 (4) 3 : 1

125. Family has 3 girls and 1 boy, probability of son at 5th birth is :

(1) 50% (2) 25% (3) 75% (4) 100%

126. Dihybrid test cross ratio in a mendelian cross :

(1) 9 : 3 : 3 : 1

(2) 1 : 1 : 1 : 1

(3) 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1

(4) 3 : 1

127. **Statement - I :** The 1/4 : 1/2 : 1/4 ratio of TT : Tt : tt is mathematically condensable to the form of the binomial expression $(ax + by)^2$

Statement - II : $(1/2\ T + 1/2\ t)^2 = (1/2\ T + 1/2\ t) X (1/2\ T + 1/2\ t) = 1/4\ TT + 1/2\ Tt + 1/4\ tt$

(1) Statement I and II both are correct

(2) Statement I and II both are incorrect

(3) Only Statement I is correct

(4) Only Statement II is correct

128. **Statement - I :** dominance is not an autonomous feature of a gene or the product that it has information for.

Statement - II : a single gene product always produces more than one effect.

(1) Statement I and II both are correct

(2) Statement I and II both are incorrect

(3) Only Statement I is correct

(4) Only Statement II is correct

129. **Statement - I :** X-linked recessive trait shows transmission from carrier female to male progeny.

Statement - II : The possibility of a female becoming a haemophilic is extremely rare.

(1) Statement I and II both are correct

(2) Statement I and II both are incorrect

(3) Only Statement I is correct

(4) Only Statement II is correct

130. In incomplete dominance

(1) F_1 phenotype is intermediate between dominant and recessive phenotype

(2) F_1 resemble both the parents

(3) A single gene product produces more than one effects

(4) The F_2 genotypic and phenotypic ratio are different.

131. In Griffith's experiment :-

(1) The protein coat from pathogenic cells was able to transform non-pathogenic cells.

(2) Heat killed pathogenic cells caused pneumonia.

(3) Some substance from pathogenic cells was transferred to non-pathogenic cells and causes transformation.

(4) The polysaccheride coat of bacteria caused Pneomonia.

132. DNA mRNA hybrids are made by using :-

(1) Reverse transcriptase (2) DNA polymerase

(3) RNA polymerase (4) DNA ligase

133. In a nucleoside unit N-glycosidic bond is formed between :-

(1) Nitrogenous base and sugar

(2) Phosphoric acid and sugar

(3) Sugar and sugar

(4) Two nucleotide unit

134. Which one confer stability in addition to H bond for double helix :-

(1) Phosphodiester bond

(2) Base pair stacking over other

(3) Antiparallel nature

(4) All of these

135. Which of the following modifies the structure of repressor so it can not bind to operator :-

(1) Co-repressor

(2) Inducer

(3) Tryptophan

(4) All of the above

SECTION - B (BOTANY)

136. Which of the following statement regarding the linkage of genes is not correct ?

(1) The strength of linkage is determined by the distance between the two genes.

(2) The strength of linkage is directly proportional to the distance between two genes

(3) The two genes are said to be linked when they fail to show independent assortment

(4) Both (1) & (3)

137. Read the following statements regarding Mendelian inheritance and choose the correct option:

A. Mendel's experiments had small sample size which gave greater credibility to the data.

B. A true breeding line shows a stable trait inheritance and expression for several generations.

C. In a dissimilar pair of factors, one member of the pair dominates over the other.

D. A recessive parental trait is expressed only in its heterozygous condition.

E. Two alleles of a gene are located at same locus on homologous chromosomes.

(1) B alone is correct

(2) B, C and E are correct

(3) A and D are correct

(4) A, C and E are correct

138. Identify the correct match from the column I, II and III :-

Column-I		Column-II		Column-III	
		(AaBb × AaBb)		(AaBbCc × AaBbCc)	
1	Types of Gametes	(a)	9	(i)	8
2	Types of Phenotype	(b)	4	(ii)	8
3	Types of Genotype	(c)	4	(iii)	64
4	Total possible zygotic combination	(d)	16	(iv)	27

(1) 1 - c - ii, 2 - a - i, 3 - d - iv, 4 - b - iii

(2) 1 - c - iii, 2 - d - ii, 3 - b - i, 4 - a - iv

(3) 1 - b - i, 2 - c - ii, 3 - a - iv, 4 - d - iii

(4) 1 - b - ii, 2 - c - i, 3 - d - iv, 4 - a - iii

139. Examples of dissimilar sex chromosome are given below :-

I. XX – XY ⇒ I

II. XX – XO ⇒ II

I and II in the above statement can be

	I	II
(1)	Man and most insect	Cockroach and roundworms
(2)	Cockroach and roundworms	Man and most insect
(3)	Butterfly	Fishes
(4)	Bird	Reptiles

140. Match the following :-

(A)	Human female	(i)	2A + XY
(B)	Male *Drosophila*	(ii)	2A + XX
(C)	Male Grasshopper	(iii)	2A + ZW
(D)	Female Birds	(iv)	2A + XO

	A	B	C	D
(1)	(i)	(ii)	(iv)	(iii)
(2)	(ii)	(i)	(iii)	(iv)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(i)	(ii)	(iii)	(iv)

141. Which of the following is incorrect for garden pea ?

	Character	Genotype	Phenotype
(1)	Flower position	Homozygous or heterozygous	Terminal
(2)	Seed colour	Homozygous or heterozygous	Yellow
(3)	Pod colour	Homozygous or heterozygous	Green
(4)	Pod shape	Only homozygous	Constricted

142. **Statement-I :** Colour blindness is an autosomal recessive disorder.

Statement-II : Colour blindness occur in about 8% of males and only about 0.4% of females.

(1) Both Statement are correct

(2) Statement-II is incorrect and statement-I correct

(3) Statement-I is incorrect and II is correct

(4) Both Statement are incorrect

143. **Statement-I:** In most of insects the mechanism of sex determination is of XO type.

Statement-II: In birds female heterogamety is present.

(1) Both statements are true.

(2) Statement-I is true and Statement-II is false.

(3) Both statements are false.

(4) Statement-I is false and Statement-II is true.

144. **Assertion (A):** Mendel's law of independent assortment does not hold good for the genes that are located closely on the same chromosome.

Reason (R) : Closely located genes on a chromosome assort independently.

In the light of the above statements choose the correct answer from the options given below :

(1) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(2) **(A)** is incorrect but **(R)** is correct

(3) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(4) **(A)** is correct but **(R)** is not correct

145. **Assertion :** Phenylketonuria is an example of pleiotropy

Reason : It is caused due to mutation in the gene that codes for the enzyme phenylalanine hydroxylase.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

146. **Assertion :-** When two genes in a dihybrid cross were situated on the same chromosome, the proportion of parental gene combinations were much higher than the non-parental type.

Reason :- This is due to the physical association or linkage of the two genes.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

147. **Assertion :** Mendel found that the phenotype of F_1 heterozygote Tt to be exactly like the TT parent in appearance.

Reason : In a pair of dissimilar factors one dominates the other.

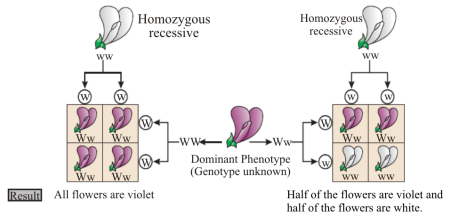
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion

(2) Both Assertion and Reason are true and Reason is not correct explanation of Assertion

(3) Assertion is true Reason is false

(4) Assertion is false Reason is true

148. Observe the given diagram & select the correct option :-


Homozygous recessive
ww
W
w
Ww
Homozygous recessive
ww
Dominant Phenotype (Genotype unknown)
WW
Ww
ww
Result
All flowers are violet
Half of the flowers are violet and half of the flowers are white.

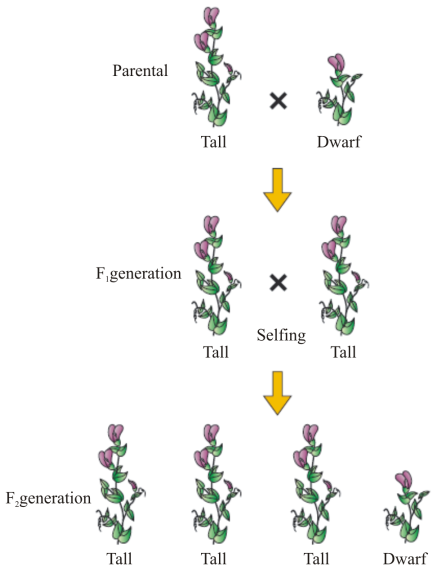
(1) It is the diagrammatic representation of a out cross.

(2) It is the comparison of two monohybrid crosses, used to find out the phenotype of organisms.

(3) It is the diagrammatic representation of reciprocal cross to find out the genotype of organism.

(4) It is the diagrammatic representation of test cross to find out the genotype of organisms.

149. Given below in the diagrammatic representation of a monohybrid cross. In this, find out the genotypes of tall plants in all the given generations



	A Parents	B F_1-generation	C F_2-generation
(1)	TT	TT,Tt	TT,Tt
(2)	Tt	Tt	TT,Tt
(3)	TT	Tt	TT,Tt
(4)	TT	TT	Tt

150. **Assertion (A)** : Human Genome project (HGP) was called a mega project.
Reason (R) : The Human Genome project was co-ordinated by the U.S. Department of Energy and the National Institute of Health.
Choose the correct answer :

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

nology And Its Applications, Microbes In Human Welfare,

SECTION - A (ZOOLOGY)

151. Given below are two statements :

Statement I : Restriction endonuclease finds its specific recognition sequence and binds to the DNA.

Statement II : Restriction Endonuclease cuts each of the two strands of the double helix at specific points in their sugar phosphate backbone.

In the light of the above statements, choose the **correct** answer from the options given below:

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is true but **Statement II** is false.

(3) **Statement I** is false but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

152. Match the column I with column II

	Column-I		Column-II
(A)	Recombination protein	(I)	Study of disease
(B)	Restriction site	(II)	ADA deficiency
(C)	Gene therapy	(III)	Palindrome
(D)	Transgenic animal	(IV)	Heterologous host

Choose the correct answer from the options given below :

(1) A-III, B-IV, C-I, D-II

(2) A-IV, B-III, C-II, D-I

(3) A-II, B-I, C-IV, D-III

(4) A-III, B-I, C-IV, D-II

153. Which of the following statements are correct ?
(A) In PCR denaturation of double stranded DNA is induced by high temperature.
(B) Cry II Ab control the cotton bollworms.
(C) There are an estimated 200,000 documented varieties of basmati rice in India.
(D) In PCR, RNA primers are synthesised by primase.
(E) DNA fragments can be separated by a technique known as gel electrophoresis.
Choose the most appropriate answer from the options given below :

(1) A, B and C only

(2) A, B and E only

(3) A, C and E only

(4) B, C and E only

154. Which of the following enzyme is called as molecular scissor ?

(1) Ligase

(2) Lysozyme

(3) Chitinase

(4) Restriction enzymes

155. If we ligate a foreign DNA at BamHI site in pBR322, then recombinant plasmid will :-

(1) Show tetracycline resistance only

(2) Grow on tetracycline containing medium

(3) Show ampicillin resistance only

(4) Will not grow on ampicillin containing medium

156. DNA fragments movement on agarose gel during gel electrophoresis-

(1) Smaller fragment near anode

(2) Larger fragment near anode

(3) Smaller fragment near cathode

(4) Smaller fragment near well

157. Which one of the following statement is incorrect ?

(1) The first restriction endonuclease was Hind II

(2) E.F.B. stands for European federation of biotechnology.

(3) Restriction enzymes belong to a larger class of enzymes called nucleases.

(4) DNA is a hydrophobic molecule, it can pass through cell membrane.

158. The lysozyme is needed for isolating genetic material from

(1) Bacteria

(2) Fungus

(3) Plant cell

(4) Animal cell

159. The correct sequence of different steps of polymerase chain reaction is –

(1) annealing ⟶ denaturation ⟶ extension

(2) denaturation ⟶ extension ⟶ annealing

(3) denaturation ⟶ annealing ⟶ extension

(4) extension ⟶ denaturation ⟶ annealing

160. A restriction endonuclease breaks bonds between the -

(1) Base pairs of DNA molecule.

(2) Base pairs of DNA-RNA hybrid molecule.

(3) Sugar and phosphate components of a nucleic acid molecule.

(4) Exon and introns of a DNA molecule.

161. Identify the palindromic sequence is the following :

(1) $\frac{\text{GAATTC}}{\text{CTTUUG}}$ (2) $\frac{\text{GGATCC}}{\text{CCTAGG}}$

(3) $\frac{\text{CCTGG}}{\text{GGACC}}$ (4) $\frac{\text{CGATA}}{\text{GCTAA}}$

162. The ladybird and Dragonflies are useful to get rid of respectively-

(1) Mosquitoes and aphids

(2) Aphids and mosquitoes

(3) Bollworn and Corn borers

(4) Corn borers and bollworms

163. Baculoviruses are-

(1) Species specific, narrow spectrum insecticide

(2) Species specific, broad spectrum insecticide

(3) Non-specific, narrow spectrum insecticide

(4) Non-specific, broad spectrum insecticide

164. Bottled juice are clarified by use of :-

(1) Streptokinase

(2) Cyclosporin A

(3) Pectinases, Proteases

(4) Pectin, Protein

165. Which of the following pair represent microbes used as biofertilisers in paddy field?

(1) Rhizobium and Frankia

(2) Azotobacter and Glomus

(3) Anabaena and Nostoc

(4) Pseudomonas and Thiobacillus

166. Statin Refers to

(1) Blood Cholesterol Lowering Agents

(2) Cholesterol synthesising Enzyme

(3) Non Competitive inhibitor for the Enzyme synthesis for synthesis of Cholesterol

(4) Remove clots from blood vessel

167. Read the following statements and choose the correct option-

Statement A : Antibiotics has helped us in controlling infectious diseases like diphtheria, whooping cough and pneumonia.

Statement B : Lactic acid bacteria is involved in formation of curd.

(1) Only A is correct

(2) Only B is correct

(3) Both A and B are correct

(4) Both A and B are incorrect

168. A free living fungus species, commonly found in root ecosystem, which is used as bio control agent is treatment of plant disease :-

(1) Trichoderma (2) Bacillus

(3) Pericillium notatum (4) Saccharomyces

169. Today we know more than __A__ restriction enzymes that have been isolated from over __B__ strains of bacteria :-

(1) A ⟶ 12, B ⟶ 30

(2) A ⟶ 30, B ⟶ 12

(3) A ⟶ 230, B ⟶ 900

(4) A ⟶ 900, B ⟶ 230

170. Pomato is produce by the process of -

(1) Somatic embryogenesis

(2) Somatic hybridisation

(3) Micro propagation

(4) Totipotency

171. The capacity to generate a whole plant from any cell /*explant* is called -

(1) Totipotency

(2) Explant

(3) Somaclonal variation

(4) Somatic hybridisation

172. Which one of the following is a case of correct matching ?

(1) Callus – unorganised mass of cells produced in tissue culture.

(2) Protoplast fusion – A technique of cybridization.

(3) Protoplast – A cell without cell membrane.

(4) Cytokinins – for surface sterlization.

173. Suitable explant for raising virus free plant is/are :-

(1) Apical meristem only

(2) Axillary meristem only

(3) Both apical and axillary meristem

(4) Root meristem only

174. The "Roquefort cheese" are ripened by a :

(1) Specific bacteria

(2) Specific fungi

(3) Specific virus

(4) Specific protozoa

175. Given below are two statement :

Statement I : Two DNA sequences were prepared corresponding to A and B, chains of human insulin and were introduced in the plasmids of *Agrobacterium* to produce insulin chain.

Statement II : Chain A and B were produced separately, extracted and combined by creating disulphide bonds to form human insulin.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both **Statement I** and **Statement II** are false

(2) **Statement I** is true but **Statement II** is false

(3) **Statement I** is false but **Statement II** is true

(4) Both **Statement I** and **Statement II** are true

176. The milk of first transgenic cow, Rosie was nutritionally a more balanced produce for human babies than natural cow-milk because it contains :

(1) human alpha - lactalbumin

(2) human beta - lactalbumin

(3) alpha-1-antitrypsin

(4) beta-1-antigrypsin

177. **Statement-I :-** Genetic modification has made crops tolerant to abiotic stress.

Statement-II :- A nematode Meloidegyne incognitia infects the leaves of tobacco plant.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

178. What happens when a single-stranded DNA or RNA, tagged with a radioactive molecule, is allowed to hybridize to its complementary DNA in a clone of cells?

(1) The clone with the mutated gene will appear on the photographic film.

(2) The clone with the mutated gene will not appear on the photographic film.

(3) The clone with the mutated gene will glow under UV light.

(4) The clone with the mutated gene will change its color.

179. Human protein α-1-antitrypsin used to treat :-

(1) Alzheimer

(2) Cancer

(3) Emphysema

(4) Rheumatoid arthritis

180. Corn borer insect is controlled by toxin coded by :

(1) cry I Ab gene

(2) cry II Ab gene

(3) cry I Ac gene

(4) cry I Ac and cry II Ab genes

181. **Statement-A :-** The Indian Parliament has recently cleared the fifth amendment of the Indian Patents Bill.

Statement-B :- Transgenic mice are being developed for use in testing the safety of vaccines before they are used on humans.

(1) Both A and B are correct

(2) Only A is correct

(3) Only B is correct

(4) Both A and B are incorrect

182. Nematods specific gene is introduced into tobacco plant through -

(1) Bacteriophage vector

(2) *Agrobacterium* vector

(3) Retrovirus

(4) Transposon

183. Given below are 2 statement: one is labelled as Assertion(A) and other is labelled as Reason (R).

Assertion (A) : Toxic insecticidal protein of *Bacillus thuringiensis* does not kill Bacillus it self.

Reason (R) : In Bacillus Bt toxin protein exist as inactive protoxins.

In the light of above statements, choose the correct answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(3) (A) is correct but (R) is not correct

(4) (A) is not correct but (R) is correct

184. Which of the following statements are correct regarding the process of RNA interference?

(a) It is a novel strategy to produce pest resistant plants.

(b) This method involves silencing of specific tRNA due to complementary dsDNA molecule.

(c) RNAi takes place in all eukaryotic and prokaryotic organism as a method of cellular defense.

Choose the **correct** answer from the options given below :

(1) a,b

(2) a,c

(3) only a

(4) a, b and c

185. Match column-I with column-II and select the correct answer from the options given below :

	Column-I		**Column-II**
(a)	ELISA	(i)	Mobile genetic elements
(b)	Transposons	(ii)	Gene therapy
(c)	Probe	(iii)	Based on principle of antigen-antibody interaction
(d)	Retroviral vector	(iv)	Single stranded DNA or RNA tagged with a radioactive molecule

(1) a-(iii), b-(i), c-(iv), d-(ii)

(2) a-(ii), b-(iii), c-(iv), d-(i)

(3) a-(iii), b-(i), c-(ii), d-(iv)

(4) a-(i), b-(ii), c-(iii), d-(iv)

SECTION - B (ZOOLOGY)

186. How many of the following are not a part of biotechnology?

Synthesising a gene, using biopesticides, developing DNA vaccine, organic farming, correcting a defective gene, in vitro fertilisation.

(1) Zero

(2) One

(3) Two

(4) Three

187. **Assertion** - Polymerase Chain Reaction (PCR) serves the purpose of early diagnosis.

Select the correct explanation of the above assertion from the given reasons -

(1) For effective treatment of a disease, early diagnosis and understanding its pathophysiology is very important.

(2) PCR is based on the principle of antigen-antibody interaction.

(3) Very low concentration of a bacteria or virus can be detected by amplification of their nucleic acid by PCR

(4) Presence of a pathogen (bacteria, viruses, etc.) is normally suspected when the pathogen has produced a disease symptom.

188. Which of the following methods is commonly used for introducing foreign DNA into animal cell ?

(1) Agrobacterium tumifaciens

(2) Gene gun

(3) Retroviruses

(4) Ti - plasmid

189. Match List-I with list-II

	List-I		**List-II**
(a)	Micro-injection	(i)	Small chemically synthesised oligonucleotide
(b)	Taq polymerase	(ii)	Replacement of a faulty gene by a normal healthy gene.
(c)	Gene therapy	(iii)	Used in PCR
(d)	Primer	(iv)	Introduce alien DNA into host cells

Choose the correct answer from the option given below.

(1) a–ii, b–i, c–iv, d–iii

(2) a–i, b–iii, c–ii, d–iv

(3) a–iv, b–iii, c–ii, d–i

(4) a–iii, b–iv, c–i, d–ii

190. Match List I with List II.

List I		**List II**	
A.	*Clostridium butylicum*	I.	Ethanol
B.	*Saccharomyces cerevisiae*	II.	Streptokinase
C.	*Trichoderma polysporum*	III.	Butyric acid
D.	*Streptococcus* sp.	IV.	Cyclosporin-A

Choose the correct answer from the options given below:

(1) A-III, B-I, C-II, D-IV

(2) A-II, B-IV, C-III, D-I

(3) A-III, B-I, C-IV, D-II

(4) A-IV, B-I, C-III, D-II

191. Given below are some tank of sewage treatment plant :-
A. Secondary settling tank
B. Primary settling tank
C. Anaerobic sludge digester
D. Aearation tank
Choose the correct sequence from the options given below :-

(1) C-D-A-B (2) B-D-A-C
(3) B-D-C-A (4) C-A-D-B

192. **Statement-I :** The bacterium responsible for biogas production are collectively called methanogens.
Statement-II : methanogens are part of flocs.

(1) Both I and II are correct.
(2) I correct, II incorrect.
(3) I is incorrect, II is correct.
(4) Both incorrect.

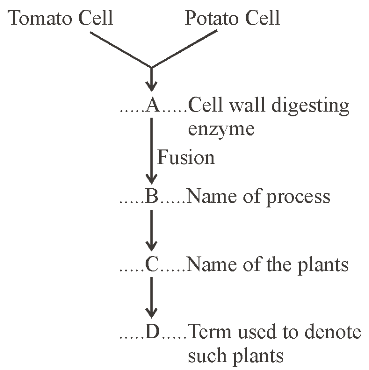
193. ***Assertion :*** Meristem culture is used for recovery of healthy plants from diseased plants.
Reason : Tissue culture is done under aseptic conditions.

(1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) If Assertion is True but the Reason is False.
(4) If both Assertion & Reason are False.

194. **Assertion :** Somatic hybrids are not used for commercial utilisation.
Reason : Somatic hybrids do not have all desired combination of characteristics.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

195. Fill in the blanks :-


Tomato Cell
Potato Cell
.....A.....Cell wall digesting enzyme
Fusion
.....B.....Name of process
.....C.....Name of the plants
.....D.....Term used to denote such plants

Choose the correct option for A, B, C and D :-

(1) A-Cellulose, B-Somatic hybridisation, C-Pomato, D-Somatic hybrid
(2) A-Cellulase, B-Somatic hybridisation, C-Tomato, D-Somatic hybrid
(3) A-Cellulase, B-Parasexual hybridisation, C-Pomato, D-Somatic hybrid
(4) A-Cellulase, B-Parasexual hybridisation, C-Tomato, D-Somatic hybrid

196. Important objective of biotechnology in agriculture is to :

(1) increase nitrogen content in plant.
(2) decrease the seed number.
(3) increase the plant weight.
(4) produce pest resistant varieties of plant.

197. Read the statements carefully ?
(I) Basmati rice is distinct for its unique aroma and flavor and 27 documented varieties of basmati are grown in India.
(II) The Indian Government has set up organisations such as G.E. A.C.
(III) Probe is a single stranded DNA or RNA tagged with a radioactive molecule.
How many above statement is / are correct.

(1) Only I (2) Only II
(3) Only I and II (4) I, II and III

198. The use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people, concerned without compensatory payment is called :-

(1) Biopatent
(2) Biopiracy
(3) Biowar
(4) Bioprocess

199. Which statement is correct ?

(1) Insulin hormone consist of two short polypeptide chain A & B.
(2) Intra disulphide bond present between A & B chain of Insulin.
(3) Insulin hormone consist of two long polysaccharide A & B chain
(4) Pro-insulin lower the blood glucose level.

200. **Statement-A :** At present about 30 recombinant therapeutics have been approved for human use the world over.
Statement-B : 27 documented varieties of Basmati rice are grown in India.

(1) Both A and B are true
(2) Only A is true
(3) Only B is true
(4) Both A and B are false

ARNING PROGRAMME
Session : 2024 - 2025)

TEST # 03
10-11-2024

ERIES / JOINT PACKAGE COURSE

g/Pass Students

IIT TEST # 03

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.

पढ़ें।
f this Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections**. **Section A** will consist of **35** questions (all questions are mandatory) and **Section B** will have **15** questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

में, अंग्रेजी संस्करण को ही अंतिम माना जाएगा।
estion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature : ____________

d Rank in Pre-Medical 2025

Physics (Temperature and Thermal Expansion, Calorimetry,

SECTION - A (PHYSICS)

1. Two wires are made of same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 6A. If on applying a force F, length of first wire increases by $\Delta \ell$, how much force is required to stretch the second wire by $2\Delta \ell$?

(1) 9 F (2) 36 F (3) 72 F (4) F

2. If work done in stretching a wire by 1 mm is 2J, the work necessary for stretching another wire of same material, but with double the radius and half the length by 1 mm in joule is :-

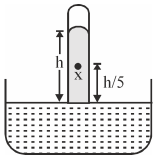
(1) 1/4 (2) 4 (3) 8 (4) 16

3. When equal volumes of two liquids are mixed, the specific gravity of mixture is 7/2. When equal masses of the same two liquids are mixed the specific gravity is 12/7. The specific gravities of two liquids are.

(1) 1 and 6 (2) 2 and 6

(3) 2 and 4 (4) 3 and 6

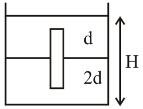
4. The height of mercury barometer is h when the atmospheric pressure is 10^5 Pa. The pressure at point x in the shown diagram is :-



(1) 10^5 Pa (2) 0.8×10^5 Pa

(3) 0.2×10^5 Pa (4) 120×10^5 Pa

5. A homogeneous solid cylinder of length $L\left(L < \frac{H}{2}\right)$ cross-sectional area $\frac{A}{5}$, is immersed such that it floats with its axis vertical at the liquid-liquid interface, with length $\frac{L}{4}$ in the denser liquid as shown in the figure. The lower density liquid is open to atmosphere having pressure P_0. Then density D of solid is given by



(1) $\frac{5}{4}d$ (2) $\frac{4}{5}d$ (3) 4d (4) $\frac{d}{5}$

6. (i) Buoyant force depends upon orientation of the concerned body inside the liquid.
(ii) Buoyant force depends upon the density of the body immersed.
(iii) Buoyant force depends on the fact whether the system is on moon or on the earth.
(iv) Buoyant force depends upon the depth at which the body (fully immersed in the liquid) is placed inside the liquid.
Of these statements (Assuming liquid is of uniform density) :

(1) Only (i), (ii) and (iv) are correct.

(2) Only (ii) is correct.

(3) Only (iii) and (iv) are correct.

(4) (i), (ii) and (iv) are incorrect.

7. In which of the following cases, will the liquid flow in a pipe be closest to the laminar flow.

(1) liquid of high viscosity and high density, flowing through a pipe of small radius.

(2) liquid of high viscosity and low density flowing through a pipe of small radius

(3) liquid of low viscosity and low density flowing through a pipe of large radius

(4) liquid of low viscosity and high density flowing through a pipe of large radius.

8. **Assertion :** A gypsy car has canvas top. When the gypsy runs at high speed, the top bulges out.

Reason : According to Bernouli's theorem total energy per unit volume of an ideal fluid, in steady flow is constant i.e.

$P + \rho gh + \frac{1}{2} \rho V^2 = \text{constant}$

(1) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

(2) Both Assertion and Reason are true, but Reason is not correct explanation of the Assertion.

(3) Assertion is true, but the Reason is false.

(4) Assertion is false, but the Reason is true.

9. ***Assertion* (A) :** Machine parts are jammed in winter.

***Reason* (R) :** The viscosity of lubricant used in machine part decrease at low temperature.

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

10. A rectangular film of liquid is extended from (4 cm × 2 cm) to (5 cm × 4cm). If the work done is 3×10^{-4}J, the value of surface tension of the liquid is.

(1) 0.2 N/m (2) 8.0 N/m

(3) 0.250 N/m (4) 0.125 N/m

11. A thin wire ring is floating on the surface of a liquid. If the excess force required to lift it upwards, (before the liquid film breaks) from the liquid-surface is 16 N and surface tension of the liquid is $\frac{4}{\pi}$ N/m, then the radius of the ring is :-

(1) 1 m (2) 2 m (3) 0.5 m (4) 0.1 m

12. Two unequal soap bubbles are formed one on each side of a tube closed in the middle by a tap. What happens when the tap is opened to put the two bubbles in communication ?

(1) No air passes in any direction as the pressure are the same on two sides of the tap

(2) Larger bubble shrinks and smaller bubble increases in size till they become equal in size

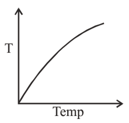
(3) Smaller bubble gradually collapses and the bigger one increases in size

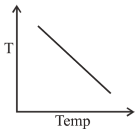
(4) None of the above

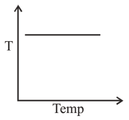
13. The angle of contact between glass and water is 0° and it rises in a capillary upto 6 cm when its surface tension is 70 dynes/cm. Another liquid of surface tension 140 dynes/cm, angle of contact 60° and relative density 2 will rise in the same capillary by:

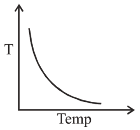
(1) 12 cm (2) 24 cm (3) 3 cm (4) 6 cm

14. The graph that correctly represent the variation of surface tension with temperature over small temperature change for water, will be :-

(1)


(2)


(3)


(4)


15. Find the viscosity of glycerine (having density 1.3 g cm^{-3}) if a steel ball of 2 mm radius (density 8 g cm^{-3}), acquires a terminal velocity of 4 cm s^{-1} in falling freely in the tank of glycerine

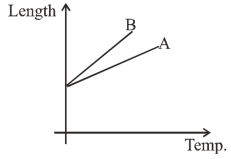
(1) 14.6 poise (2) 12.2 poise

(3) 10.4 poise (4) 9.8 poise

16. Water flows in a stream-line manner through a capillary tube of radius a. The pressure difference being P and the rate of flow is Q. If the radius is reduced to a/2 and the pressure difference is increased to 2P, then the rate of flow becomes:-

(1) 4Q (2) 2Q (3) Q (4) Q/8

17. Length v/s Temperature graph of two bodies A & B is given below. Find the relation between α_A & α_B.



(1) $\alpha_A > \alpha_B$ (2) $\alpha_A = \alpha_B$

(3) $\alpha_A < \alpha_B$ (4) can't say

18. On a temperature scale, the ice point is at –20° and the steam point is at 180°. When this thermometer reads 5°, then find the reading of centigrade thermometer.

(1) 25°C (2) 12.5°C

(3) 10°C (4) 50°C

19. A vessel of volume V and thermal coefficient of linear expansion α is completely filled with a liquid. The liquid does not overflow on heating. The maximum thermal coefficient of volume expansion of liquid can be

(1) $\frac{V-\alpha}{V}$ (2) $\frac{V}{V-\alpha}$ (3) α (4) 3 α

20. Water falls from a height of 210 m. If whole of energy due to fall is converted into heat, the rise in temperature of water would be (J = 4.3 Joule/Cal).

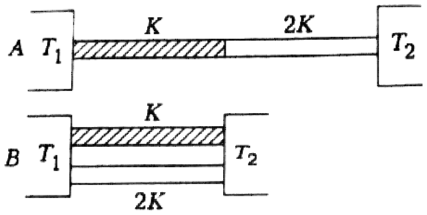
(1) 42°C (2) 49°C (3) 0.49°C (4) 4.9°C

21. An electrically heated coil is immersed in a calorimeter containing 360 gm of water at 10°C. The coil consumes energy at the rate of 90 watts. The water equivalent of calorimeter and coil is 40 gm. The temperature of water after 10 minutes is:

(1) 4.214°C (2) 42.14°C

(3) 30°C (4) none of these

22. Two rods with the same dimensions have thermal conductivities in the ratio 1 : 2. They are arranged between heat reservoirs with the same temperature difference, in two different configurations, A and B. The rates of heat flow in A and B are I_A and I_B respectively. The ratio I_A/I_B is equal to:-



(1) 1:2 (2) 1:3 (3) 2:5 (4) 2:9

23. The freezer in a refrigerator is located at the top section so that :-

(1) The entire chamber of the refrigerator is cooled quickly due to convection

(2) The motor is not heated

(3) the heat gained from the environment is high

(4) The heat gained from the environment is low

24. A bright metal plate on which there is a dry black spot is heated up to nearly 1400K and then quickly brought in dark room. Which of the following statement is true-

(1) Spot will appear brighter than the plate

(2) Spot will appear darker than the plate

(3) Both spot and plate will appear equally bright

(4) Spot and plate will not be visible in dark room

25. Four spheres A, B, C and D are of same radius but made of different metals. Their densities are in ratio 6 : 3 : 4 : 5 and specific heats are in ratio 2 : 5 : 4 : 6. These are initially kept at the same temperature and placed in the same surroundings. The sphere which has the slowest rate of cooling is :-

(1) C (2) B (3) D (4) A

26. Radiation energy emitted by a body depends on :
(A) Surface area of body
(B) Temperature difference between body and its surroundings
(C) Time (t)
(D) Nature of material of body
Correct statement are :-

(1) Only (A), (B)

(2) Only (B), (C)

(3) Only (A), (B), (C)

(4) All (A), (B), (C), (D)

27. A body cools from a temperature 3T to 2T in 10 minutes. The room temperature is T. Assume that Newton's law of cooling is applicable. The temperature of the body at the end of next 10 minutes will be -

(1) $\frac{7}{4}$T (2) $\frac{3}{2}$T (3) $\frac{4}{3}$T (4) T

28. Incorrect postulate of kinetic molecular theory of gas is:

(1) The actual volume of the molecules of gas is negligible in comparison to the empty space between them

(2) There is no force of attraction between the particles of a gas at ordinary temperature and pressure

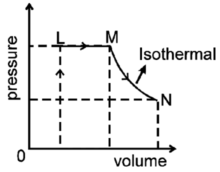
(3) Collisions of molecules are perfectly elastic

(4) At any particular time, different particles in the gas have same speeds and hence same kinetic energies

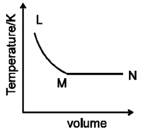
29. Gas at a pressure P_0 is contained in a closed vessel. If the masses of all the molecules are halved and their speeds are doubled, the resulting pressure P will be equal to

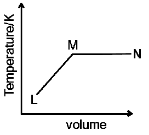
(1) $4P_0$ (2) $2P_0$ (3) P_0 (4) $\frac{P_0}{2}$

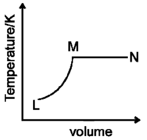
30. A fixed mass of ideal gas undergoes changes of pressure and volume starting at L, as shown in Figure.

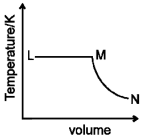


Which of the following is correct :

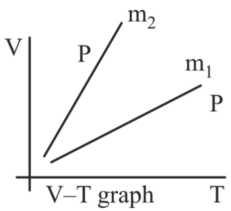
(1)


(2)


(3)


(4)


31. For two different mass samples (m_1 and m_2) of an ideal gas V - T graph is as shown then



(1) $m_1 > m_2$ (2) $m_1 < m_2$

(3) $m_1 = m_2$ (4) None

32. The respective speeds of the molecules are 1, 2, 3, 4 and 5 km/s. The ratio of their r.m.s. speed and the average speed will be

(1) $\sqrt{11} : 3$ (2) $3 : \sqrt{11}$

(3) 1 : 2 (4) 3 : 4

33. **Assertion (A) :-** In the formula $P = \frac{2}{3}E$, the term E represents translational kinetic energy per unit volume of gas.

Reason (R) :- In case of monoatomic gas translational kinetic energy and total kinetic energy are equal.

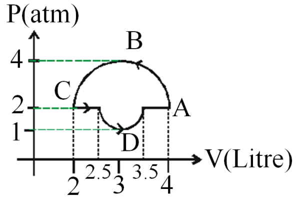
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct but **(R)** is the correct explanation of **(A)**

34. Find work done by the gas in the process shown in figure :



(1) $\frac{5}{2}\pi$ atm L (2) $\frac{5}{2}$ atm L

(3) $-\frac{3}{2}\pi$ atm L (4) $-\frac{5}{4}\pi$ atm L

35. One mole of an ideal monoatomic gas at temperature T_0 expands slowly, according to law P = KV (K is a constant). If final temperature is $2T_0$, heat supplied to gas is

(1) $2RT_0$ (2) $\frac{3}{2}RT_0$

(3) RT_0 (4) $\frac{RT_0}{2}$

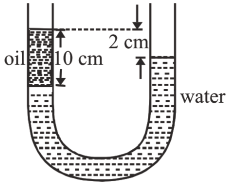
SECTION - B (PHYSICS)

36. The approximate depth of an ocean is 2700 m. The compressibility of water is 45.4×10^{-11} Pa^{-1} and density of water is 10^3 kg/m^3. What fractional compression of water will be obtained at the bottom of the ocean ?

(1) 1.0×10^{-2} (2) 1.2×10^{-2}

(3) 1.4×10^{-2} (4) 0.8×10^{-2}

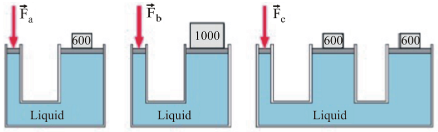
37. The density of water is 1.0 g/cm^3. The density of the oil in the left column of the U-tube shown below is :-



(1) 0.20 g/cm^3 (2) 0.80 g/cm^3

(3) 1.0 g/cm^3 (4) 1.3 g/cm^3

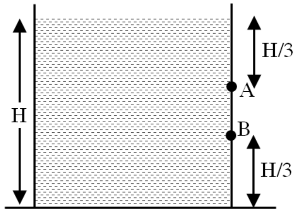
38. Rank in order, from largest to smallest the magnitudes of the forces $\vec{F}_a$, $\vec{F}_b$ and $\vec{F}_c$ required to balance the masses. The masses are in kilograms.



(1) $F_a = F_b = F_c$ (2) $F_a > F_b = F_c$

(3) $F_b > F_a = F_c$ (4) $F_c > F_a > F_b$

39.



In given figure, two small holes A and B of same area are given. Which of the following is correct ?

(1) Speed of efflux is same for both A & B.

(2) Time of flight is more for A than B.

(3) Range is more for B than A.

(4) Volume flow rate is more at A than B.

40. In close tap water pressure is 3.5 × 10^5 Pa. When tap open then water pressure becomes 3 × 10^5 Pa. Then velocity of flow of water from tap is :-

(1) 5 m s^{-1} (2) 10 m s^{-1}

(3) 20 m s^{-1} (4) 40 m s^{-1}

41. When a large bubble rises from the bottom of a lake to its surface, its radius doubles. The atmospheric pressure is equal to that of the columns of water of height H. The depth of the lake is-

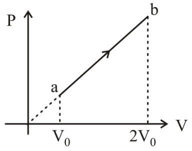
(1) 8H (2) 7H (3) 2H (4) H

42. If for a liquid in a glass vessel force of cohesion is twice of force of adhesion then :
(A) The meniscus will be convex
(B) The liquid will wet the glass
(C) The angle of contact will be obtuse
(D) There will be capillary descent in a glass capillary dipped in liquid
Correct options is/are :

(1) Only (B) (2) All (A), (B). (C), (D)

(3) Only (A), (C) (4) Only (A), (C), (D)

43. In the (P-V) diagram shown in figure, choose the correct statement for the process a-b.



(a) density of gas has reduced to half.

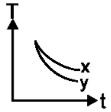
(b) Temperature of gas has increased to two times.

(c) Internal energy of gas has increased to four times.

(d) T-V graph is a parabola passing through origin

(1) a, b, c (2) a, b, d (3) a, c, d (4) a, b, c, d

44. The temperature of bodies X and Y vary with time as shown in the figure. If emissivity of bodies X and Y are e_X & e_Y and absorptive powers are A_X and A_Y, (assume other conditions are identical for both) then:



(1) $e_Y > e_X$, $A_Y > A_X$ (2) $e_Y < e_X$, $A_Y < A_X$

(3) $e_Y > e_X$, $A_Y < A_X$ (4) $e_Y < e_X$, $A_Y > A_X$

45. The power emitted per unit area of a black body is R watt/m^2. At what wavelength, will the power radiated by the black body be maximum, if the Stefan's constant is σ and Wein's constant is b :-

(1) $\lambda = \left(\frac{b\sigma}{R}\right)^{1/4}$ (2) $\lambda = \left(\frac{b}{R}\right)^{1/4}$

(3) $\lambda = \left(\frac{bR}{\sigma}\right)^{1/4}$ (4) $\lambda = b\left(\frac{\sigma}{R}\right)^{1/4}$

46. R_s, d and R_e are the radius of sun, distance between sun and earth and radius of earth respectively. If temperature of sun is T, then amount of radiation power incident on earth is.

(1) $\left(\frac{R_s}{d}\right)^2 \sigma T^4$ (2) $\left(\frac{R_s}{d}\right)^2 \sigma T^4(2\pi R_e^2)$

(3) $\left(\frac{R_s}{d}\right)^2 \sigma T^4(\pi R_e^2)$ (4) $\left(\frac{R_s}{R_e}\right) \sigma T^4(\pi d^2)$

47. A vessel is filled with an ideal gas at a pressure of 20 atm and it is at a temperature of 27°C. One half of the mass is removed from the vessel and temperature of remaining gas is increased to 87°C. At this temperature find the pressure of the gas :-

(1) 10 atm (2) 12 atm

(3) 8 atm (4) none

48. A gas has molar heat capacity C = 4.5 R in the process PT = constant. The number of degrees of freedom of molecules in the gas is :-

(1) 4 (2) 3 (3) 6 (4) 5

49. Match the following two column for 4 moles of an ideal diatomic gas at room temperature T.

	Column-I		Column-II
(a)	Translational kinetic energy	(P)	4RT
(b)	Rotational kinetic energy	(Q)	– 8RT
(c)	Potential energy	(R)	6RT
(d)	Total internal energy	(S)	None

(1) a-P, b-Q, c-R, d-S (2) a-R, b-P, c-S, d-S

(3) a-R, b-P, c-S, d-Q (4) a-R, b-Q, c-P, d-S

50. An ideal gas after going through a series of four thermodynamic states in order, reaches the initial state again (cyclic process). The amounts of heat (Q) and work (W) involved in the states are,
$Q_1 = 6000$ J; $Q_2 = -5500$ J;
$Q_3 = -3000$ J; $Q_4 = 3500$ J;
$W_1 = 2500$ J; $W_2 = -1000$ J;
$W_3 = -1200$ J; $W_4 = x$ J
The ratio of net work done by the gas to the total heat absorbed by the gas is η. The value of x and η are nearly :

(1) 500 J; 7.5% (2) 700 J; 10.5%

(3) 1000 J; 21% (4) 1500 J; 15%

SECTION - A (CHEMISTRY)

51. Which of the following is incorrect option :-

(1) $Ca^{2+} < K^+ < Cl^- < S^{2-}$: radius

(2) O < S < F < Cl : $\Delta_{eg}H$

(3) F > Cl > Br > I : EN (Electronegativity)

(4) Li < Be < B < C : $\Delta_i H$

52. Which is correctly matched ?

	Column-I (IUPAC Name)	Column-II (Element is Name)
(1)	Uuu	Rontgenium
(2)	Uns	Hassium
(3)	Unt	Darmstadtium
(4)	Uub	Rutherfordium

53. **Assertion :** Group 18 elements are gases at room temperature.
Reason : All have stable configuration ns^2np^6

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

54. Match the following columns :-

	Column-I (Oxide)		Column-II (Nature of oxide)
(A)	MnO	(P)	Amphoteric
(B)	CO	(Q)	Acidic
(C)	SiO_2	(R)	Neutral
(D)	Cr_2O_3	(S)	Basic

Correct code is :-

(1) A⟶P, B⟶Q, C⟶R, D⟶S

(2) A⟶Q, B⟶P, C⟶S, D⟶R

(3) A⟶S, B⟶R, C⟶Q, D⟶P

(4) A⟶R, B⟶S, C⟶P, D⟶Q

55. Correct order of IP is –

(1) B > Tl > Ga > Al > In

(2) B > Ga > Al > Tl > In

(3) B > Tl > Ga > In > Al

(4) B > Ga > In > Tl > Tl

56. How many of the following are amphoteric oxides ?
$ZnO, B_2O_3, BeO, Cr_2O_3, V_2O_5, PbO_2, Al_2O_3, TeO_2$.

(1) 4

(2) 5

(3) 6

(4) 7

57. Match the column :-

	Column A (General electronic configuration)		Column B (Block)
(i)	$(n-1)d^{1-10}\,ns^{0-2}$	(a)	s-block
(ii)	$(n-2)f^{1-14}\,(n-1)d^{0-1}\,ns^2$	(b)	p-block
(iii)	$ns^2\,np^{1-6}$	(c)	d-block
(iv)	$ns^{1-2}\,np^0$	(d)	f-block

(1) (i) – (a), (ii) – (b), (iii) – (c), (iv) – (d)

(2) (i) – (c), (ii) – (d), (iii) – (a), (iv) – (b)

(3) (i) – (d), (ii) – (c), (iii) – (b), (iv) – (a)

(4) (i) – (c), (ii) – (d), (iii) – (b), (iv) – (a)

58. What is the correct energy order of given sub-shells (6s, 6p, 4f, 5d) :

(1) 6s < 5d < 4f < 6p

(2) 4f < 5d < 6s< 6p

(3) 6s < 4f < 5d< 6p

(4) 5d < 4f < 6s< 6p

59. Match the column :

	Column A (Symbol of elements)		Column B (First ionisation enthalpy) ($kJ\ mol^{-1}$)
(i)	Na	(a)	737
(ii)	Mg	(b)	575
(iii)	Al	(c)	786
(iv)	Si	(d)	496

Correct match is

(1) (i) - (d), (ii) - (b), (iii) - (a), (iv) - (c)

(2) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)

(3) (i) - (c), (ii) - (a), (iii) - (b), (iv) - (d)

(4) (i) - (a), (ii) - (b), (iii) - (c), (iv) - (d)

60. **Statement 1 :** Na^+ and Al^{3+} are isoelectronic but the magnitude of ionic radius of Al^{3+} is less than that of Na^+.
Statement 2 : The magnitude of effective nuclear charge of the outershell electrons in Al^{3+} is greater than that in Na^+.
Which of the following is correct for these is statements-

(1) Both statement-I and statement-II are true.

(2) Both statement-I and statement-II are false.

(3) Statement -1 is True, Statement-2 is False.

(4) Statement -1 is False, Statement-2 is True.

61. The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmosphere to 10 atmosphere is : (Given $R = 2.0\ cal\ K^{-1}\ mol^{-1}$)

(1) 0 calorie

(2) –413.14 calories

(3) 413.14 calories

(4) 100 calories

62. In which of the following processes entropy increases ?
A. A liquid evaporates to vapour
B. Temperature of a crystalline solid lowered from 130 K to 0K.
C. $2NaHCO_{3(s)} \longrightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D. $Cl_{2(g)} \longrightarrow 2\,Cl_{(g)}$
Choose the **correct** answer from the options given below :

(1) A and C (2) A, B and D

(3) A, C and D (4) C and D

63. Match **List-I** with **List-II** :

List-I (Process /Property)		List-II (Characteristics)	
A.	Adiabatic process	I.	Independent of amount of substance
B.	Reversible process	II.	Both way process reactant to product and vice-versa
C.	Intensive property	III.	No transfer of heat between system and surroundings.
D.	Extensive property	IV.	Dependent on amount of substance

Choose the **correct** answer from the options given below:

(1) A-I, B-II, C-IV, D-III

(2) A-III, B-II, C-I, D-IV

(3) A-I, B-II, C-III, D-IV

(4) A-II, B-III, C-IV, D-I

64. Consider the following statement and select the correct option :

(1) Thermodynamics is concerned about the rate at which a reaction proceeds.

(2) ΔG is positive for a non-spontaneous reaction

(3) Enthalpy of sublimation of a substance is equal to enthalpy of vaporisation

(4) There is an exchange of energy as well as matter between the system and the surroundings in a closed system.

65. The value of $\Delta H - \Delta U$ when 2 moles of solid benzoic acid (C_6H_5COOH) undergoes combustion at 300 K is given by ?

(1) –1.247 kJ (2) –2.494 kJ

(3) +2.494 kJ (4) +1.247 kJ

66. Choose the substance which has higher possible entropy (per mole) at a given temperature.

(1) Solid carbon dioxide

(2) Nitrogen gas at 1 atm

(3) Nitrogen gas at 0.01 atm

(4) Nitrogen gas at 0.0001 atm

67. If 1000 J/g of heat is absorb at 100°C by water, then ΔS is ?

(1) $48.25\ J\ K^{-1}\ mole^{-1}$

(2) $15.1\ J\ K^{-1}\ mole^{-1}$

(3) $30.2\ J\ K^{-1}\ mole^{-1}$

(4) $60.75\ J\ K^{-1}\ mole^{-1}$

68. Match the following columns :-

	Column-I		Column-II
(A)	$CH_4(g) \longrightarrow C(g) + 4H(g)$	(P)	Enthalpy of solution
(B)	$6C(graphite) + 3H_2(g) \longrightarrow C_6H_6(l)$	(Q)	Enthalpy of combustion
(C)	$C_6H_{12}O_6(s) + 6O_2(g) \longrightarrow 6CO_2(g) + 6H_2O(l)$	(R)	Lattice enthalpy
(D)	$NaCl(s) \longrightarrow Na^+(aq) + Cl^-(aq)$	(S)	Enthalpy of atomization
(E)	$NaCl(s) \longrightarrow Na^+(g) + Cl^-(g)$	(T)	Enthalpy of formation
(F)	$C_2H_4(g) + H_2(g) \longrightarrow C_2H_6(g)$	(U)	Enthalpy of hydrogenation

Correct match will be :-

(1) A-R, B-S, C-P, D-Q, E-U, F-T

(2) A-U, B-T, C-S, D-R, E-P, F-Q

(3) A-S, B-T, C-Q, D-P, E-R, F-U

(4) A-S, B-T, C-U, D-R, E-P, F-Q

69. The bond enthalpies of $H_{2(g)}$, $X_{2(g)}$ and $HX_{(g)}$ are in the ratio of 2 : 1 : 2. If the enthalpy for formation of $HX_{(g)}$ is –50 kJ mol^{-1}, the bond enthalpy of H_2 is

(1) 200 kJ mol^{-1} (2) 400 kJ mol^{-1}

(3) 100 kJ mol^{-1} (4) 300 kJ mol^{-1}

70. Enthalpy of combustion of carbon to carbon dioxide is –390.0 kJ mol^{-1}. The amount of heat released, when 35.0 g of CO_2 is formed from the reaction of carbon and dioxygen gas, is (Approx) :

(1) 490 kJ (2) 245 kJ

(3) 700 kJ (4) 310 kJ

71. In the reaction : $S + \frac{3}{2} O_2 \longrightarrow SO_3 + 2x$ kcal and $SO_2 + \frac{1}{2} O_2 \longrightarrow SO_3 + y$ kcal, heat of formation of SO_2 is

(1) (x + y) (2) (x – y)

(3) (2x + y) (4) –(2x – y)

72. Standard molar enthalpy of formation of CO_2 is equal to

(1) zero

(2) the standrad molar enthalpy of combustion of carbon (diamond)

(3) the sum of standard molar enthalpies of formation of CO and O_2

(4) the standard molar enthalpy of combustion of carbon (graphite)

73. For the hypothetical reaction

$$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$$

$\Delta_rG°$ and $\Delta_rS°$ are 20 kJ/mol and – 20 JK^{-1} mol^{-1} respectively at 200 K. If Δ_rC_p is 20 $JK^{-1}mol^{-1}$ then $\Delta_rH°$ at 400 K is :-

(1) 20 kJ/mol

(2) 7.98 kJ/mol

(3) 28 kJ/mol

(4) None of these

74. From the following select the one which is **not** an example of corrosion.

(1) Rusting of iron object

(2) Production of hydrogen by electrolysis of water

(3) Tarnishing of silver

(4) Development of green coating on copper and bronze ornaments

75. The resistance of a 1N solution of salt is 50 Ω. Calculate the equivalent conductance of the solution, if the two platinum electrodes in solution are 2.1 cm apart and each having an area of 4.2 cm^2.

(1) 10 ohm^{-1} cm^2 eq^{-1}

(2) 0.1 ohm^{-1} cm^2 eq^{-1}

(3) 10 ohm^{-1} m^2 eq^{-1}

(4) 0.3 ohm^{-1} m^2 eq^{-1}

76. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is :
(Given : Molar mass of Cu : 63 g mol^{-1}, 1F = 96487 C)

(1) 3.15 g (2) 0.315 g

(3) 31.5 g (4) 0.0315 g

77. The equation $\Lambda_m^c = \Lambda_m^o - A\sqrt{C}$, where symbols have their usual meaning, is valid for :-

(1) NaCl (2) $CaCl_2$

(3) $MgSO_4$ (4) All of the above

78. Two half cell reactions are given below
$Fe^{+2}(aq.) \longrightarrow Fe^{+3}(aq.) + e^-$; $E^o_{Fe^{+2}/Fe^{+3}} = -0.77V$
$2I^-(aq.) \longrightarrow I_2(s) + 2e^-$; $E^o_{I^-/I_2} = -0.54V$
then $E°_{cell}$ of cell with feasible redox reaction is :

(1) 1.31 V

(2) –0.23 V

(3) 0.23 V

(4) 1 V

79. For a cell Cu(s) | Cu^{+2}(0.001 M) || Ag^+ (0.01 M) | Ag(s), cell potential is found to 0.43 V at 298 K then E^o_{cell} is :
(Given $\frac{2.303RT}{F} = 0.06$)

(1) 0.4 V (2) 0.46 V (3) 0.37 V (4) 0.49 V

80. Which of the following show maximum molar conductivity ?

(1) 0.1 M NaCl (2) 0.01 M NaCl

(3) 0.5 M NaCl (4) 0.001 M NaCl

81. The values of conductivity of material A, B and C at 298.15 K in Sm^{-1} are 2.1×10^3, 1.0×10^{-18} and 1×10^{-7}. Choose the correct answer from the options given below :

(1) A is conductor, B and C are insulator

(2) A is conductor, B is insulator and C is semiconductor

(3) A is insulator, B is conductor and C is semiconductor

(4) A is semiconductor, B and C are insulator

82. Match the column-I with column-II

	Column-I (Solution)		Column-II (Product of electolysis)
(P)	aq. NaCl (Pt electrode)	(i)	Anode ⇒ Cl_2 Cathode ⇒ Sodium amalgam
(Q)	dilute H_2SO_4 (Pt electrode)	(ii)	Anode ⇒ Cl_2 Cathode ⇒ Na
(R)	aq. NaCl (Hg electrode)	(iii)	Anode ⇒ O_2 Cathode ⇒ H_2
(S)	Molten NaCl (Pt electrode)	(iv)	Anode ⇒ Cl_2 Cathode ⇒ H_2

(1) P⟶(i); Q⟶(ii); R⟶(iv); S⟶(iii)

(2) P⟶(i); Q⟶(ii); R⟶(iii); S⟶(iv)

(3) P⟶(iv); Q⟶(iii); R⟶(i); S⟶(ii)

(4) P⟶(iv); Q⟶(iii); R⟶(ii); S⟶(i)

83. Λ_m^o for $CaCl_2$, NaCl and CH_3COONa are 270, 125 and 91 S cm^2 mol^{-1} respectively. Calculate Λ_m^o for $(CH_3COO)_2Ca$:-

(1) 120 S cm^2 mol^{-1} (2) 420 S cm^2 mol^{-1}

(3) 238 S cm^2 mol^{-1} (4) 202 S cm^2 mol^{-1}

84. The reversible work done by a galvanic cell is equal to :-

(1) Decrease in enthalpy

(2) Decrease in it's Gibb's energy

(3) Decrease in it's entropy

(4) $\frac{nF}{E_{cell}}$

85. Which of the following statement is correct ?

(1) The value of electrode potential depend on stoichiometry of half reaction as it is an extensive property.

(2) In electrolytic cell, cathode is negative electrode whereas in Galvanic cell cathode is positive electrode

(3) Cell reaction is spontaneous, if ΔG = +ve or E_{cell} = –ve.

(4) The potential of individual half-cell can be measured.

SECTION - B (CHEMISTRY)

86. For the third period elements the correct increasing order of first ionisation energy is :-

(1) Na < Mg < Al < Si < P < S < Cl < Ar

(2) Na < Al < Mg < Si < P < S < Cl < Ar

(3) Na < Al < Mg < Si < S < P < Cl < Ar

(4) Na < Mg < Al < Si < S < P < Cl < Ar

87. The correct order of decreasing second ionisation enthalpy of Ti(22), V(23), Cr(24) and Mn(25) is:

(1) Mn > Cr > Ti > V (2) Ti > V > Cr > Mn

(3) Cr > Mn > V > Ti (4) V > Mn > Cr > Ti

88. Which of the following statement is/are correct :
(a) Transition metal are present in 3 to 12 group
(b) III B group contain 32 elements
(c) Alkali metal are present in all period
(d) Si and Ge are metalloid
Correct answer is :
(1) a, b, c (2) b, c, d
(3) d, b (4) a, c, d

89. Which of the following is correct order of atomic radii.
(1) Li > Be > Na > Mg
(2) Na > Mg > Li > Be
(3) Na > Li > Mg > Be
(4) Li > Na > Mg > Be

90. Read the following statement :
(A) Americans named of atomic number (Z = 103) is Rutherfordium whereas soviets named it kurchatovium.
(B) 'Tl' is p-block element.
(C) Na, Mg, Te, I are representative element.
(D) A cation is smaller than its parent atom because it has fewer electrons while its nuclear charge remains the same.
How many total no. of above statements are correct :
(1) 2 (2) 3 (3) 1 (4) 4

91. For a certain thermochemical reaction, $P \rightleftharpoons Q$ at $T = 300$ K the value of $\Delta H° = 50$ kJ mol^{-1} and $\Delta S° = 20$ JK^{-1} then the value of equilibrium constant for the reaction will be :-
(1) 2.4×10^2 (2) 2.2×10^{-8}
(3) 4.6×10^{-6} (4) 1.6×10^8

92. 2 moles of an ideal gas expands reversibly and isothermally from 10 dm^3 to 100 dm^3 then calculate entropy change of surrounding-
(1) 38.2 J/K (2) –38.2 J/K
(3) 16.6 J/K (4) –16.6 J/K

93. The standard enthalpy of neutralization is –57.3 kJ mol^{-1} as :

$$\underset{\text{Strong acid}}{HCl_{(aq)}} + \underset{\text{Strong base}}{NaOH_{(aq)}} \rightarrow NaCl_{(aq)} + H_2O(\ell)$$

$\Delta H = -57.3$kJ mol^{-1}
The enthalpy of neutralization of 0.25 mole of HCl by 0.25 mol of NaOH is :
(1) –28.3 kJ mol^{-1} (2) –14.32 kJ mol^{-1}
(3) +57.3 kJ mol^{-1} (4) –57.3 kJ mol^{-1}

94. Lattice enthalpy of NaCl(s) is 788 kJ/mol. Enthalpy of hydration of Na^+(g) and Cl^-(g) is –300 kJ/mol and –484 kJ/mol respectively . Then heat of solution ($\Delta_{sol}H$) of NaCl(s) is :
(1) –4 kJ/mol (2) 12 kJ/mol
(3) 4 kJ/mol (4) 0

95. The following two reactions are known :
$Fe_2O_3(s) + 3CO(g) \longrightarrow 2Fe(s) + 3CO_2(g)$;
$\Delta H = -26.8$ kJ
$FeO(s) + CO(g) \longrightarrow Fe(s) + CO_2(g)$;
$\Delta H = -16.5$ kJ
then for following reaction
$Fe_2O_3(s) + CO(g) \longrightarrow 2FeO(s) + CO_2(g)$, $\Delta H = ?$
(1) –43.3 kJ (2) –10.3 kJ
(3) + 6.2 kJ (4) + 10.3 kJ

96. The standard cell potential of the following cell
$Zn|Zn^{2+}(aq)||\ Fe^{2+}(aq)|Fe$
is 0.32 V. Calculate the standard Gibbs energy change for the reaction :
$Zn(s) + Fe^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Fe(s)$
(Given : 1 F = 96487C)
(1) –61.75 kJ mol^{-1}
(2) +5.006 kJ mol^{-1}
(3) –5.006 kJ mol^{-1}
(4) +61.75 kJ mol^{-1}

97. In which of the following conversion 3F charge is required-
(A) 1.5 mol of Ca from molten $CaCl_2$
(B) 0.5 mol of Al from molten Al_2O_3
(C) 1 mol of FeO to Fe_2O_3
(D) 0.6 mol of MnO_4^- to Mn^{+2}
Choose the correct answer from options given below :-
(1) A, B and D
(2) A and D
(3) A, B and C
(4) B and D

98. Given below are standard electrode potentials
$K^+/K = -2.93$ V, $Ag^+/Ag = 0.8$ V
$Mg^{+2}/Mg = -2.37$ V, $Cr^{3+}/Cr = -0.74$ V
then select the correct increasing order of reducing power of these metals-
(1) K, Mg, Cr, Ag
(2) Ag, Cr, Mg, K
(3) K, Ag, Cr, Mg
(4) Cr, Ag, Mg, K

99. For a reaction $A(s) + 2B^+(aq.) \rightleftharpoons A^{+2}(aq.) + 2B(s)$
K_c has been found to be 10^6. Then $E°_{cell}$ is :
(1) 0.36 V
(2) 0.18 V
(3) 0.708 V
(4) 0.0098 V

100. $\underset{(1atm)}{Pt, H_2(g)} / H^+(10^{-1}M) \parallel H^+(1M) / \underset{(1atm)}{H_2(g)}, Pt$
find the E_{cell} for given cell.
(1) 0.0295 V
(2) 0.0591 V
(3) –0.0295 V
(4) –0.0591 V

Biological Classification, Plant Kingdom

SECTION - A (BOTANY)

101. The main criteria for five Kingdom classification are :-
(A) Cell structure
(B) Thallus organization
(C) Mode of nutrition
(D) Reproduction
(E) Phylogenetic relationships
(1) A, B & D only
(2) A,B & E only
(3) A, C & D only
(4) A,B,C,D & E

102. Which organisms are not mentioned in the five kingdom classification ?
(1) Virus and lichens
(2) Virus and prions
(3) Virus, viroids, lichens and prions
(4) Bacteria, virus and lichens

103. Find the incorrect statements from the following:-
(A) Bacterial structure is very simple but very complex in behaviour
(B) Bacteria show the most extensive metabolic diversity
(C) The vast majority of bacteria are autotrophs and a few are heterotrophs
(D) Bacterial cell wall is made up of lipoprotein
(1) Only A & B (2) Only C & D
(3) Only A & D (4) Only B & C

104. Which organism are responsible for red appearance of sea by their rapid multiplication?
(1) *Euglena*
(2) *Noctiluca*
(3) *Gonyaulax*
(4) *Trypanosoma*

105. Read the following pair :-

(A) Desmid-Golden algae
(B) Dinoflagellates-Chrysophyte
(C) Slime mould -Saprophytic
(D) Euglenoids-Pellicle present
(E) Protozoa-Unicellular prokaryotes

Choose the correct pair :-

(1) Only A, B, C, D (2) Only B, C, D, E

(3) Only A, C, D (4) Only B, C, D

106. Consider the following four (A-D) statements.

(A) Spores of slime moulds do not have any walls

(B) Euglena shows autotrophic as well as heterotrophic nutrition

(C) Dinoflagellates have plated cell wall in which silica particles embedded

(D) Diatoms lack flagella/cilia but they float passively on water surface

Which of the above statement(s) is/are not correct ?

(1) A and C (2) A, C and D

(3) B and C (4) B and D

107. In which of the following plasmogamy is followed by karyogamy immediately?

(1) *Mucor* (2) *Aspergillus*

(3) *Ustilago* (4) *Puccinia*

108. Which fungi causes rust and smut diseases respectively?

(1) *Ustilago* and *Agaricus*

(2) *Puccinia* and *Ustilago*

(3) *Puccinia* and *Agaricus*

(4) *Ustilago* and *Puccinia*

109. Choose the incorrect match from following :-

(1) *Albugo* - Phycomycetes

(2) *Agaricus* - Ascomycetes

(3) *Puff balls* - Basidiomycetes

(4) *Alternaria* - Deuteromcycetes

110. White spots seen on mustard leaves are due to which fungus ?

(1) *Alternaria* (2) *Albugo*

(3) *Rhizopus* (4) *Mucor*

111. Which of the following is an unicellular fungi ?

(1) *Penicillium* (2) *Neurospora*

(3) *Aspergillus* (4) *Saccharomyces*

112. Which information is not related with lichen :-

(1) Show mutually useful association between two organisms.

(2) Algal component is known as phycobiont.

(3) They always grow in polluted areas.

(4) Fungi provide water in lichen.

113. Mumps, small pox, herpes disease caused by :-

(1) Bacteria and virus

(2) Virus and fungi

(3) Virus

(4) Bacteria, fungi and protozoa

114. Consider the following statements about *Mycoplasma* :

(I) They completely lack a cell wall

(II) Mycoplasma is the smallest living organism

(III) They can not survive without oxygen

(IV) Many mycoplasma are pathogenic in animals and plants.

Which of the statements given above are **correct**?

(1) I, II and III (2) II, III and IV

(3) I, II and IV (4) I, III and IV

115. Which of the following is not an example of Protista Kingdom ?

(1) *Paramoecium* (2) *Gonyaulax*

(3) Golden algae (4) *Porphyra*

116. The cell wall of fungi are composed of :-

(1) Chitin and cellulose

(2) Cellulose and polysaccharides

(3) Chitin and polysaccharides

(4) Chitin, polysaccharides and glycogen

117. Match Column-I with Column-II and select the correct option from the codes given below :-

	Column - I		**Column - II**
A	Chief producers in oceans	i	Euglenoids
B	Red tides	ii	Diatoms
C	Pigments identical to higher plants	iii	Slime moulds
D	Plasmodium	iv	Dinoflagellates

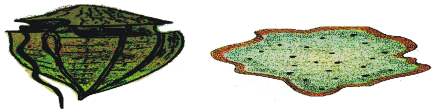
(1) A-(ii),B-(iv), C-(i), D-(iii)

(2) A-(ii),B-(iv), C-(iii), D-(i)

(3) A-(ii),B-(iii), C-(i), D-(iv)

(4) A-(i),B-(iv), C-(iii), D-(ii)

118. Identify the organism given in the below figure



(1) *Euglena* and *Paramoecium*

(2) Slime mould and *Amoeba*

(3) Dinoflagellates and *Chlamydomonas*

(4) Dinoflagellates and Slime mould

119. Bacteria is a group of prokaryotic organisms which is characterized by :-

(1) 70s ribosomes

(2) Peptidoglycan cell wall

(3) ds circular naked DNA

(4) All of these

120. Choose the incorrect pair :–

(1) Halophiles - extreme salty areas

(2) Thermoacidophiles - hot sulphur springs

(3) Methanogens - marshy areas

(4) Viruses facultative parasite

121. Which of the following pigments are found in brown algae ?

(1) Chlorophyll a, Chlorophyll d

(2) Chlorophyll a, Chlorophyll b

(3) Chlorophyll a, Chlorophyll c, fucoxanthin

(4) Chlorophyll a, Chlorophyll d, Phycobilins

122. Match the following column correctly :

	Column I		**Column II**
(A)	Green Algae	(i)	Floridean Starch
(B)	Brown Algae	(ii)	Paramylum and fat
(C)	Red Algae	(iii)	Laminarin and Mannitol
(D)	*Euglena*	(iv)	Starch and oil droplets

(1) A-iv, B-iii, C-i, D-ii

(2) A-iii, B-iv, C-i, D-ii

(3) A-i, B-ii, C-iii, D-iv

(4) A-iv, B-i, C-ii, D-iii

123. Arrange the following plant groups in ascending order with respect to the gradual reduction of gametophytic stage :-

a. Bryophyta
b. Pteridophytes
c. Angiosperm
d. Gymnosperm

(1) a, b, c, d

(2) b, c, d, a

(3) a, b, d, c

(4) b, d, c, a

124. Which of the following pteridophytes are heterosporous in nature ?

(1) *Selaginella* and *Salvinia*

(2) *Adiantum* and *Equisetum*

(3) *Psilotum* and *Lycopodium*

(4) *Adiantum* and *Psilotum*

125. Read the following Statements and select the correct option :-

Statement-A : Funaria have multi-cellular and branched rhizoids.

Statement-B : In moss, second stage of gametophyte is the protonema.

(1) Only statement A is correct.

(2) Only statement B is correct.

(3) Both statements A and B are correct.

(4) Both statements A and B are incorrect.

126. **Assertion (A) :-** In vascular plants, sporophyte is main, dominant, free-living plant body.

Reason (R) :- Sporophyte differentiated in roots, stem and leaves in vascular plants.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

127. Which event is a precursor to the seed habit considered as an important step in evolution ?

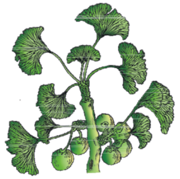
(1) Embryo formation

(2) Endosperm formation

(3) Heterosporous

(4) Vascular tissue development

128. Given figure belongs to gymnosperms :-
Find out incorrect option regarding this figure.



(a)

(1) It is a one of the tallest tree

(2) It has long and dwarf shoots

(3) It is *Ginkgo bioloba* plant.

(4) It is a heterosporous spermatophyte.

129. Which of the following algae belong to the class phaeophyceae ?

(1) *Polysiphonia, Dictyota*

(2) *Gracilaria, Gelidium*

(3) *Ectocarpus, Sargassum*

(4) *Laminaria, Chara*

130. The following given members shows zygotic meiosis except :

(1) *Chlorella*

(2) Dinoflagelletes

(3) *Funaria*

(4) *Acetabularia*

131. Select the organism which belong to the class Lycopsida

(1) *Adiantum* (2) *Selaginella*

(3) *Equisetum* (4) *Psilotum*

132. Viruses that infect bacteria are usually have :

(1) Double stranded DNA

(2) Single stranded RNA

(3) Single stranded DNA

(4) Double stranded RNA

133. Which of the following statement is incorrect:

(1) In gymnosperms the male and female gametophytes have an independent free-living existence

(2) In gymnosperms the male gametophyte has an independent life where as female gametophyte is dependent

(3) In gymnosperms the male & female gametophyte don't have an independent free living existence

(4) Both 1 and 2

134. **Statement-1 :** Majority of the Red algae are marine with greater concentrations found in the warmer areas.

Statement-2 : Sexual reproduction in Red algae is oogamous and accompanied by complex post fertilization Developments.

(1) Statement-1 and Statement-2 both are correct.

(2) Statement-1 and Statement-2 both are incorrect.

(3) Statement-1 is correct and Statement-2 is incorrect.

(4) Statement-1 is incorrect and Statement-2 is correct.

135. The predominant stage of the life cycle of a moss is the gametophyte which consists of two stages. These stages respectively are :-

(1) Primary stage - leafy stage
Secondary stage - protonema

(2) Primary stage - prothallus
Secondary stage - protonema

(3) Primary stage - protonema
Secondary stage - leafy stage

(4) Primary stage - leafty stage
Secondary stage - prothallus

SECTION - B (BOTANY)

136. Which of the following is not a feature of Protista kingdom ?

(1) Membrane bound organelles

(2) Well defined nucleus

(3) Primarly aquatic

(4) All protistian have cellulosic cell wall

137. Select the mismatch in given pair

(1) Green algae - *Chara*

(2) Brown algae - *Fucus*

(3) Red algae - *Porphyra*

(4) BGA - *Chlamydomonas*

138. Sporophyte depend on gametophyte is character of -

(1) *Salvinia*

(2) *Adiantum*

(3) *Polytrichum*

(4) *Lycopodium*

139. Gametes formed in *Spirogyra* are :-

(1) Flagellated and similar in size

(2) Non-flagellated and dissimilar in size

(3) Flagellated and dissimilar in size

(4) Non-flagellated and similar in size

140. Which of the following is not a moss ?

(1) *Funaria*

(2) *Polytrichum*

(3) *Sphagnum*

(4) *Marchantia*

141. Read the following statements :

(A) Growth exhibited by non living is by accumulation of material on surface.

(B) Non-living object exhibits metabolism.

(C) Mule do not reproduce.

(D) Photoperiod not affects reproduction in seasonal breeders both plants and animals.

Choose the correct statements :

(1) (A) and (B)

(2) (C) and (D)

(3) (A) and (C)

(4) (B) and (D)

142. Which of the following statement is not correct about fungi ?

(1) Fungi show a great diversity in morphology and habitat.

(2) A zygospore is formed by fusion of two spores.

(3) The asexual spores are conidia produced exogenously.

(4) The basidiospores are exogenously produced on the basidium.

143. The asexual reproduction of fungi may occur by means of -

(1) Zoospores, oospores and ascospores

(2) Aplanospores, ascospores and zygospores

(3) Zoospores, aplanospores and conidia

(4) Aplanospores, zygospores and basidiospores

144. Which of the following disease is caused by prions

(1) Potato spindle tuber disease

(2) Herpes disease

(3) Mad cow disease

(4) Influenza disease

145. **Statement I :** Bacteria reproduce mainly by spore formation.

Statement II : Chemosynthetic bacteria play a great role in recycling nutrients like nitrogen, phosphorous, iron and sulphur.

(1) Statement I is correct but statement II is incorrect.

(2) Statement I is incorrect but statement II is correct.

(3) Both statement I and statement II are correct.

(4) Both statement I and statement II are incorrect.

146. Match the column I with column II.

	Column I		Column II
(A)	Pyrenoids	(i)	*Marchantia*
(B)	Horsetails	(ii)	*Conifers*
(C)	Gemma cups	(iii)	*Chlamydomonas*
(D)	Needle like leaves	(iv)	*Equisetum*

(1) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)

(2) (A) - (iii), (B) - (i), (C) - (ii), (D) - (iv)

(3) (A) - (iii), (B) - (iv), (C) - (i), (D) - (ii)

(4) (A) - (ii), (B) - (iii), (C) - (i), (D) - (iv)

147. Characteristic features of gymnosperm leaves is -

(1) leaves are well adapted to withstand extremes of temperature, humidity and wind.

(2) Leaves are not adapted to withstand extremes of temperature, humidity and wind

(3) Only simple type of leaves are found.

(4) Leaves are modified into stamens.

148. Match list I with List II.

	List I		List II
(A)	*Pinus*	(i)	Protonema
(B)	*Cycas*	(ii)	Prothallus
(C)	*Polytrichum*	(iii)	Mycorrhiza
(D)	*Dryopteris*	(iv)	Coralloid roots

Choose the correct answer from the options given below.

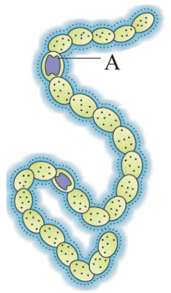
(1) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)

(2) (A) - (iii), (B) - (iv), (C) - (ii), (D) - (i)

(3) (A) - (iii), (B) - (iv), (C) - (i), (D) - (ii)

(4) (A) - (iv), (B) - (iii), (C) - (i), (D) - (ii)

149. Identify 'A' in the figure given below and to which process it is related ?



(1) Holdfast - Nitrogen fixation

(2) Heterocyst - Nitrogen fixation

(3) Heterocyst - Production of methane

(4) Pyrenoids - Storage bodies

150. Which of the following statement is incorrect ?

(1) Bryophytes play an important role in plant succession on bare rocks/soil.

(2) Red alage produced large amount of hydrocolloids algin.

(3) Pteridophytes are the first terrestrial plants to posses vasecular tissue -xylem and phloem.

(4) The gymnosperms are heterosporous.

SECTION - A (ZOOLOGY)

151. The extinct human who lived 1,00,000 to 40,000 years ago in East and Central Asia, used hides to protect their bodies and had brain capacity of 1400 c.c. were:

(1) Homo habilis

(2) Neanderthal man

(3) Cro-magnon man

(4) Ramapithecus

152. Founder effect can be seen in a population because of :

(1) Constant allele frequency

(2) Genetic drift

(3) Absence of gene flow

(4) Absence of natural Selection

153. Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as :-

(1) Migration

(2) Divergent evolution

(3) Adaptive radiation

(4) Natural selection

154. Evolution by anthropogenic action includes :

(1) Herbicide and pesticide resistant varities

(2) Drug resistant microorganisms

(3) Antibiotic resistant microbes

(4) All of the above

155. There are three connotations of theory of special creation. Which of the following is not correct ?

(1) All living organisms that we see today were created as such

(2) Diversity was always the same since creation and will be the same in future.

(3) The earth is about 4000 years old.

(4) All living organisms that we see today were not created as such.

156. Match List - I with List - II.

List - I		List - II	
r.	320 mya	i.	Jaw less fish
s.	350 mya	ii.	Invertebrates formed
t.	4.5 bya	iii.	Sea weeds
u.	500 mya	iv.	Origin of earth

Choose the correct answer from the options given below.

(1) r – ii, s – iii, t – i, u – iv

(2) r – iv, s – i, t – ii, u – iii

(3) r – iii, s – i, t – iv, u – ii

(4) r – i, s – ii, t – iii, u – iv

157. Match **List-I** with **List-II**.

	List-I		List-II
A.	Gene pool	I.	Stable within a generation
B.	Genetic drift	II.	Change in gene frequency by chance
C.	Gene flow	III.	Transfer of genes into or out of population.
D.	Gene frequency	IV.	Total number of genes and their alleles

Choose the **correct** answer from the options given below :

(1) A-III, B-II, C-I, D-IV

(2) A-IV, B-II, C-III, D-I

(3) A-I, B-II, C-III, D-IV

(4) A-II, B-III, C-IV, D-I

158. **Statement-1 :** Dryopithecus was more man like.

Statement-2 : Ramapithecus was more ape like.

(1) Both statements are correct

(2) Statement-1 is correct, Statement-2 is incorrect

(3) Statement-1 is incorrect, Statement-2 is correct

(4) Both statements are incorrect

159. Select the correct statement.

(1) Fitness is the end result of the ability to adapt and get selected by nature.

(2) Natural selection and genetic variation are two main key points of darwinian theory of evolution.

(3) Adaptive ability is always inherited.

(4) Placental wolf and Tasmanian wolf are example of homology.

160. Read the statements carefully from (A-D) and select the correct option.

(A) Homology indicates common ancestry.

(B) The Geological history of earth is not related with biological history of earth.

(C) Fitness refers to physical fitness, according to Darwin.

(D) The first life form appeared about 2000 million years ago

(1) A, B and C are incorrect

(2) B, C and D are incorrect

(3) A, C and D are incorrect

(4) A, B and D are incorrect

161. Identify the correct match from column I, II and III.

	Column-I		Column-II		Column-III
(A)	*Taenia solium*	(a)	Asymmetrical	(i)	Metagenesis
(B)	Sponge	(b)	Bilateral	(ii)	Exclusively marine habitat
(C)	*Obelia*	(c)	Radial	(iii)	Alimentary canal absent
(D)	*Pleurobrachia*	(d)	Radial	(iv)	Canal system

(1) D-c-ii, C-d-i, B-a-iii, A-b-iv

(2) C-c-iii, B-a-iv, A-b-i, D-d-ii

(3) A-b-iii, B-a-iv, C-c-i, D-d-ii

(4) B-a-iv, A-b-iii, D-c-i, C-d-ii

162. **Assertion A :** Only Members of subphylum vertebrata of phylum chordata possess notochord during the embryonic period. The notochord is replaced by a cartiliaginous or bony vertebral column in the adult.

Reason R : All chordates are vertebrates but not all vertebrates are chordates.

(1) **A** is true but **R** is false

(2) **A** is false but **R** is true

(3) Both **A** and **R** are true and **R** is the correct explanation of **A**.

(4) Both A and R are true but **R** is NOT the correct explanation of **A**.

163. Select the correct statement :

(1) Reptiles are mostly aquatic

(2) Feathers are present in all birds except ostrich

(3) Pteropus is a bird

(4) Epidermal scales are present in Hemidactylus

164. Which of the following represent the incorrect combination?

	Characteristics	Class
(1)	Mouth ventral, gills without operculum ; skin with placoid scales ; persistent notochord	Chondrichthyes
(2)	Sucking and circular mouth ; Jaw absent ; body is devoid of scales and paired appendages	Cyclostomata
(3)	Body covered with feathers ; skin is dry without glands except the oil glands ; Fore-limbs form wigns ; lungs with air sacs	Aves
(4)	Mammary gland ; hairless body skin ; pinnae ; two pairs of limbs ; Oviviparous	Mammalia

165. **Statement - I :-** In poriferans sexes are not separate.

Statement - II :- The body of poriferans is supported by skeleton made up of spongin fibers or spicules.

(1) Both statements are correct.

(2) Both statements are incorrect.

(3) Both statement - I is correct - II incorrect.

(4) Statement - II is correct but - I incorrect.

166. Select the correct matched organism with their common name

	A	B
(1)	Petromyzon	Hag fish
(2)	Myxine	Lamprey
(3)	Exocoetus	Flying fish
(4)	Betta	Angel fish

167. A zoologist came across a fish that has to swim constantly in water to avoid sinking.
Identity that particular fish.

(1) Fighting fish (2) Dog fish

(3) Hippocampus (4) Catla

168. Identify the character among the following that is shared by *Carcharodon* and *Balaenoptera.*

(1) Ability to regulate body temperature

(2) Notochord is persistent throughout life

(3) Internal fertilisation and viviparity

(4) Two-chambered heart

169. Bilaterally symmetrical, triploblastic and coelomate animals. Body is covered by a calcareous shell and unsegmented body are characters of

(1) Annelida (2) Arthropoda

(3) Hemichordata (4) Mollusca

170. Radial symmetry is found in :-
(a) Coelenterates (b) Ctenophore
(c) Adult echinodermates

(1) only a (2) only b

(3) only a and b (4) All a, b and c

171. Tentacles and cnidoblasts are present in–

(1) *Pila and Pinctada*

(2) *Hydra and Obelia*

(3) Ctenoplana and Pleurobrachia

(4) Asterias and Cucumaria

172. **Statement I :** Cyclostomates are ectoparasites on some fishes.
Statement II : They have a sucking and circular mouth with jaws.

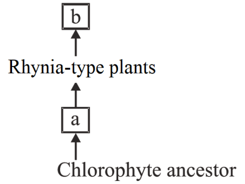
(1) Statement I is correct and II is incorrect

(2) Statement II is correct and I is incorrect

(3) Both statements are correct

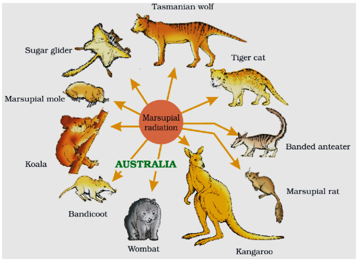
(4) Both statements are incorrect

173. Recognise the figure and find out the correct matching



(1)	a-Tracheophyte ancestar	b-Psilophyton
(2)	a–Seed fern	b–Cycad
(3)	a–Psilophyton	b–Tracheophyte
(4)	a–Psilophyton	b–Progymnosperms

174. Study the given figure. What does it represent?



(1) Convergent evolution

(2) Adaptive radiation

(3) Divergent evolution

(4) Both '2' & '3'

175. Oviparous animal with four chambered heart is -

(1) Crocodile (2) Corvus

(3) Platypus (4) All of above

176. External ear pinna are present in :-

(1) Elephus (2) Columba

(3) Hemidaetylus (4) Kobra

177. Animals who cast their scale as skin cast.

(1) Snake (2) Lizzard

(3) Hyla (4) Both (1) & (2)

178. Animal with flate body and complete digestive system with ventral mouth and dorsal anus is :

(1) Asterias (2) Limulus

(3) Dentalium (4) Hirudinaria

179. Feather like gills which helps in excretion and respiration both present in :-

(1) Pila (2) Balanoglossus

(3) Ophiura (4) Lacifer

180. Coelenterate with skeleton of $CaCO_3$ is called as :-

(1) Polyp (2) Medusa(3) Coral (4) Anemone

181. Which of the following were evolved into the first amphibians ?

(1) Sauropsids (2) Jaw less fishes

(3) Coelacanths (4) Salamanders

182. Which of the following was about 20 feet in height and with dagger like teeth ?

(1) Archaeopteryx (2) Tyranosaurus rex

(3) Tuataras (4) Icthyosaurus

183. Fossils of man-like bones have been discovered in :

(1) Tanzania and Ethopia

(2) Eastern Africa

(3) Java

(4) Australia

184. Sweet potato is _A_ modification and potato is _B_ modification. Here A and B are respectively :

(1) Stem, Root (2) Root, Stem

(3) Stem, Stem (4) Root, Root

185. Who asserted that variations, which are heritable and make resource utilization better for few will enable only those to reproduce and leave more progeny ?

(1) Thomus Malthus

(2) Lamarck

(3) Hugo Malthus

(4) Darwin

SECTION - B (ZOOLOGY)

186. Stabilizing selection favours :

(1) One extreme form over the other extreme form and over intermediate form of a trait

(2) Both extermie forms of a trait

(3) No form of a trait

(4) Intermediate form of a trait

187. Human hand, wings of bat and flipper of whale represent :

(1) Analogous organs (2) Homologous organs

(3) Evolutionary organs (4) Vestigeal organs

188. **Assertion :-** Due to continental drift pouched mammals of Australia survived.
Reason :- There was lack of competition from any other mammal.

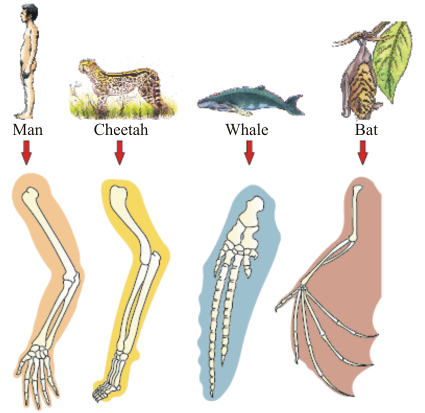
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

189.



How many statements is/are true for above diagram?
(1) In these animals, the same structure developed along different direction due to adaptation to different needs.
(2) These structure are homologous structures.
(3) These indicate common ancestory.
(4) These structures show divergent evolution.

(1) 2 (2) 3 (3) 4 (4) 1

190. Read the following statements w.r.t. Industrial melanism in England. How many of them are correct?

(i) Before industrialisation (1850s), there were more white-winged moths on trees than dark-winged or melanised moths.

(ii) After industrialisation (1920), there were more dark-winged moths in the same area.

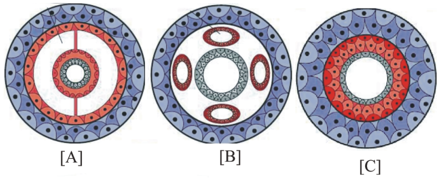
(iii) Dark-winged moths became fitter, after industrialisation, to survive and reproduce as they were better camouflaged.

(iv) Before industrialisation, thick growth of almost white-coloured lichen covered the trees in that background the white-winged moth survived but dark-winged moth were picked by the predators.

(v) In a mixed population of moths, those could better-adapt, survived and increased in population size.

(1) Three (2) Five (3) Four (4) Two

191.



Mark the correct combination of types of body cavity or coelom (shown in the above figure) in various animals from the following table?

	A	B	C
(1)	*Nereis*	*Ancylostoma*	*Fasciola*
(2)	*Taenia*	*Ascaris*	*Pheretima*
(3)	*Hirudinaria*	*Taenia*	*Ascaris*
(4)	*Wuchereria*	*Fasciola*	*Nereis*

192. Which one of the following option is correct for "Earthworm" ?

(1) Bilateral symmetry, Non-chordate, complete Digestive tract

(2) Radial symmetry, Non-chordate, Incomplete digestive tract

(3) Asymmetrical, Non-chordate, Complete digestive tract

(4) Radial symmetry, Non-chordate, Closed circulation

193. Animals are belong to largest phylum of Kingdom Animalia.

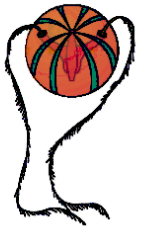
(1) Laccifer, King crab, Chiton,

(2) Dentalium, Echinus, Locusta

(3) Culex, Limulus, Scorpion

(4) Prawn, Butterfly, Hirudinaria

194. Select the incorrect option for given figure of animal?



(1) Digestion is both extra cellular and intra cellular

(2) Bioluminescence is well-marked

(3) Diploblastic with tissue level of organisation

(4) Fertilisation is internal

195. In which one of the following organisms its main excretory organs are correctly matched

(1) Earthworm – Nephridia

(2) Cockroach – Malpighian corpuscles

(3) Frog – Proboscis gland

(4) Humans – Sebaceous glands

196. Animal without notochord is :-

(1) Petromyzon (2) Saccoglossus

(3) Myxine (4) Tarpedo

197. Mesoderm in form of pouches is present in :-

(1) Fasciola (2) Ascaris

(3) Earthworm (4) Periplanata

198. Embryological support for evolution was proposed by :

(1) Alfred wallace

(2) Ernst Heckel

(3) Malthus

(4) Karl Ernst Von Baer

199. Which of following is not a Australian marsupial?

(1) Bobcat

(2) Tasmanian wolf

(3) Spotted cuscus

(4) Numbat

200. Match the columns and choose the correct option.

	Column-I		Column-II
A.	Chemical evolution	I.	Darwin
B.	Branching descent	II.	De Vries
C.	Saltation	III.	Thomas Malthus
D.	Work on Population	IV.	Oparin and Haldane

	I	II	III	IV
1	I	II	III	Iv
2	IV	III	I	II
3	IV	I	II	III
4	IV	II	I	III

NING PROGRAMME
ssion : 2024-2025)

NEET (UG)
TEST # 04
24-11-2024

ERIES / JOINT PACKAGE COURSE
g/Pass Students

nit Test # 04

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.
ढ़ें
is Test Booklet.

Important Instructions :

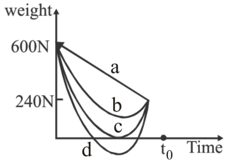
1. On the Answer Sheet, fill in the particulars on **Side-1 and Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections. Section A** will consist of 35 questions (all questions are mandatory) and **Section B** will have 15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

ले में, अंग्रेजी संस्करण को अंतिम माना जाएगा।
uestion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature :

SECTION - A (PHYSICS)

1. Suppose, the acceleration due to gravity at the earth's surface is 10 m/s^2 and at the surface of Mars it is 4.0m/s^2. A 60 kg passenger goes from the earth to the mars in a spaceship, moving with a constant velocity. Neglect all other objects in the sky. Which part of figure best represents the weight (net gravitational force) of the passenger as a function of time :



(1) a (2) b (3) c (4) d

2. The intensity of gravitational field at a point situated at a distance 8000 km from the centre of Earth is 6.0 newton/kg. The gravitational potential at that point in newton-meter/kg will be :-

(1) – 6 (2) -4.8×10^7

(3) -8×10^5 (4) -4.8×10^2

3. On a planet (whose size is the same as that of earth and mass is 4 times of the earth), the energy needed to lift a 2 kg mass vertically upwards through 2 m distance is (g = 10m/sec^2 on surface of earth) :

(1) 16 J (2) 32 J (3) 160 J (4) 320 J

4. **Statement 1 :** A particle is at a height R (equal to radius of earth) from the surface of the earth. If mass of the particle is m and acceleration due to gravity is g on the surface of earth, then its gravitational potential energy is mgR.
Statement 2 : If a particle is slowly moved in gravitational field, the work done by the external agent is equal to change in the gravitational potential energy of the particle.

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1

(3) Statement-1 is True, Statement-2 is False

(4) Statement-1 is False, Statement-2 is True

5. An object is projected vertically up from the earth's surface with velocity $\sqrt{\frac{4gR}{3}}$ where 'R' is the radius of earth and 'g' is the acceleration due to gravity at earth's surface. The maximum height reached by the object will be :

(1) R (2) 2R (3) 3R (4) 4R

6. Suppose the earth suddenly shrinks in size, still remaining spherical and mass unchanged (All gravitational forces pass through the centre of the earth).

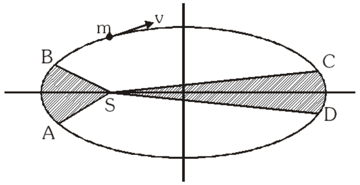
(1) The days will become shorter.

(2) The kinetic energy of rotation about its own axis will decrease

(3) Time duration of the year will increase.

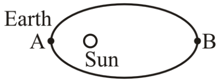
(4) The magnitude of angular momentum about its axis will increase.

7. The figure shows elliptical orbit of a planet m about the sun S. The shaded area SCD is twice the shaded area SAB. If t_1 be the time for the planet to move from C to D and t_2 is the time to move from A to B, then :



(1) $t_1 = t_2$ (2) $t_1 = 8t_2$ (3) $t_1 = 4t_2$ (4) $t_1 = 2t_2$

8. The earth is moving around the sun in an elliptical orbit. Point A is the closest and point B is the farthest point in the orbit, as shown, In comparison to the situation when the earth passes through point B :-



(1) Total energy of the earth-sun system is greater, when the earth passes through point A.

(2) Gravitational potential energy of the earth-sun system is greater, when the earth passes through point A.

(3) Kinetic energy of the earth due to the motion around the sun is greater, when it passes through the point A.

(4) Magnitude of angular momentum of the earth about the sun is greater, when the earth passes through point A.

9. Read the following statements :

S_1 : An object shall weigh more at pole than at equator when weighed by using a physical balance.

S_2 : It shall weigh the same at pole and equator when weighed by using a physical balance.

S_3 : It shall weigh the same at pole and equator when weighed by using a spring balance.

S_4 : It shall weigh more at the pole than at equator, when weighed using a spring balance.

Which of the above statements is /are correct ?

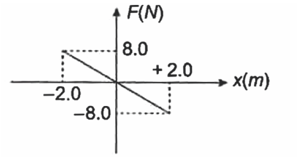
(1) S_1 and S_2

(2) S_1 and S_4

(3) S_2 and S_3

(4) S_2 and S_4

10. A body of mass 0.01 kg executes simple harmonic motion (SHM) about x = 0 under the influence of a force shown below. Time period of the SHM is :



(1) 1.05s

(2) 0.52s

(3) 0.25s

(4) 0.31s

11. For a body executing SHM-

(a) Potential energy is always equal to its kinetic energy

(b) Average potential and kinetic energy over any given time interval are always equal

(c) Average kinetic energy in one time period is equal to average potential enrgy in one time period

(d) Sum of the kinetic energy and potential energy at any time instant is constant

Correct statements are :-

(1) b and c (2) c and d

(3) a and b (4) Only b

12. A man of mass 60 kg standing on a platform executing S.H.M. in the vertical plane. The displacement from the mean position varies as y = 0.5 sin (2π ft). The value of f, for which the man will feel weightlessness at the highest point is: (y is in metres)

(1) $\frac{g}{4\pi}$ (2) $4\pi g$

(3) $\frac{\sqrt{2g}}{2\pi}$ (4) $2\pi\sqrt{2g}$

13. The amplitude of a particle executing SHM is made three-fourth keeping its time period constant. Its total energy will be (E : initial total energy)

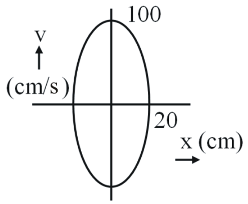
(1) $\frac{E}{2}$

(2) $\frac{3}{4}E$

(3) $\frac{9}{16}E$

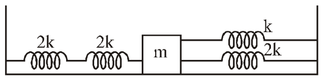
(4) None of these

14. The graph of velocity (v) and displacement (x) of a particle executing simple harmonic motion is shown in figure. The time period of oscillation of particle is –



(1) $\frac{\pi}{2}$sec (2) $\frac{\pi}{5}$sec (3) $\frac{2\pi}{5}$sec (4) $\frac{2\pi}{7}$sec

15.



The frequency of oscillation of the system shown in figure is :-

(1) $\frac{1}{2\pi}\sqrt{\frac{k}{4m}}$ (2) $\frac{1}{2\pi}\sqrt{\frac{4k}{m}}$

(3) $\frac{1}{2\pi}\sqrt{\frac{k}{7m}}$ (4) $\frac{1}{2\pi}\sqrt{\frac{7k}{m}}$

16. A simple pendulum has time period T_1. The point of suspension is now moved upward, according to the relation $y = kt^2$ ($k = 1\ m/s^2$), where y is the vertical displacement. The time period now becomes T_2. The ratio of $\frac{T_1^2}{T_2^2}$ is ($g = 10\ m/s^2$) :-

(1) 6/5 (2) 5/6

(3) 1 (4) 4/5

17. A wall clock uses a vertical spring-mass system to measure the time. Each time the mass reaches an extreme position, the clock advances by a second. The clock gives correct time at the equator. If the clock is taken to the poles it will : (neglect thermal effect)

(1) run slow.

(2) run fast.

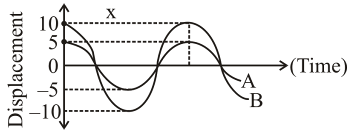
(3) stop working.

(4) give correct time.

18. A particle is moving on x-axis has potential energy $U = 2 - 20x + 5x^2$ joule along x-axis. The particle is released at $x = -3$. The maximum value of 'x' will be [x is in meter and U is in joule] :-

(1) 5 m (2) 3 m (3) 7 m (4) 8 m

19. The graph of SHM is shown for two particles A and B. The ratio of maximum accelerations of A to B is



(1) 1 : 1 (2) 1 : 2 (3) 2 : 1 (4) 1 : 4

20. The transverse displacement in a streched string is given by :

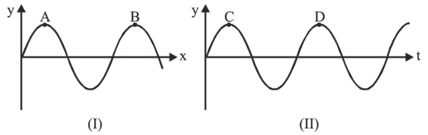
$y = 0.06\sin\left(\frac{2\pi}{3}x\right)\cos(120\pi t)$,

where x and y are in m and t is in s. The length of the string is 1.5 m and its mass is 3.0×10^{-2} kg, then tension in string is :-

(1) 648 N (2) 650 N

(3) 649 N (4) 651 N

21. The same progressive wave is represented by two graphs I and II. Graph I shows how the displacement 'y' varies with the distance x along the wave at a given time. Graph II shows how y varies with time t at a given point on the wave. The ratio of measurements AB to CD, marked on the curves, represents :-



(1) wave number k (2) wave speed v

(3) frequency ν (4) angular frequency ω

22. A source of sound of frequency 600Hz is placed inside water. The speed of sound in water is 1500 m/s and in air it is 300 m/s. The frequency of sound recorded by an observer who is standing in air is:

(1) 200 Hz (2) 3000 Hz

(3) 120 Hz (4) 600 Hz

23. Two simple harmonic waves having equal amplitudes of 8 cm and equal frequency of 10 Hz are moving along the same direction. The resultant amplitude is also 8 cm. The phase difference between the individual waves is _____ degree.

(1) 60° (2) 120° (3) 90° (4) 30°

24. A string with a linear mass density of 4×10^{-3} kg/m is under tension of 360 N and is fixed at both ends. One of its resonance frequencies is 375 Hz. The next higher resonance frequency is 450 Hz. The mass of the string in gram is :-

(1) 16 (2) 8 (3) 24 (4) 4

25. String A has a length L, radius of cross-section r, density of material ρ and is under tension T. String B has all these quantities, double those of string A. If υ_A and υ_B are the corresponding fundamental frequencies of the vibrating string, then

(1) $\upsilon_A = 2\upsilon_B$ (2) $\upsilon_A = 4\upsilon_B$

(3) $\upsilon_B = 4\upsilon_A$ (4) $\upsilon_A = \upsilon_B$

26. Two identical, but separate strings, with the same tension, carry sinusoidal waves with the same frequency. Wave A has a amplitude that is twice that of wave B and transmits energy at rate that is ______ that of wave B.

(1) Half

(2) Twice

(3) One-fourth

(4) Four times

27. A string fixed at its both ends vibrates in 5 loops.

(A) total number of nodes are 5

(B) total number of antinodes are 5

(C) string vibrates in 4th overtone

(D) length of string is 5λ

Which of the following statements are incorrect ?

(1) A, C (2) B, D (3) A, D (4) B, C

28. The speed of sound in hydrogen gas at N.T.P is 1328 m/s. If the density of hydrogen is $\left(\frac{1}{16}\right)^{th}$ of that of air, then the speed of sound in air at N.T.P is :

(1) 340 m/s

(2) 332 m/s

(3) 300 m/s

(4) 380 m/s

29. Two vibrating tuning forks producing progressive waves given by :

$y_1 = 4\sin(500\pi t)$ and $y_2 = 2\sin(506\pi t)$

are held near the ear of a person. The person will hear :-

(1) 3 beats per second with intensity ratio between maxima and minima equal to 9

(2) 3 beats per second with intensity ratio between maxima and minima equal to 2

(3) 6 beats per second with intensity ratio between maxima and minima equal to 2

(4) 6 beats per second with intensity ratio between maxima and minima equal to 9

30. A pipe open at both ends is partially submerge in water vertically and a tuning fork vibrate at the top of pipe. Length of air column can be adjusted by moving pipe vertically. The minimum length of air column is 9 cm at which there is a peak in sound intensity. Frequency of tuning fork is- (speed of sound = 343 m/s)

(1) 953 Hz (2) 1906 Hz

(3) 9.53 Hz (4) 40 Hz

31. Velocity of sound waves in air is 330 m/sec. For a particular sound in air, a path difference of 40 cm is equivalent to a phase difference of 1.6π. The frequency of this wave is :-

(1) 165 Hz (2) 150 Hz

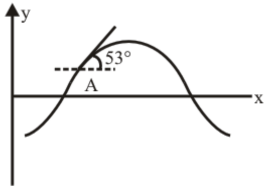
(3) 660 Hz (4) 330 Hz

32. Two sitar string A and B playing the note "Sa" are slightly out of tune and produce beats of frequency 5 Hz. The tension of the string B is slightly decreased and the beat frequency is found to decrease to 3 Hz. What is the original frequency of B if frequency of A is 255 Hz ?

(1) 250 Hz (2) 258 Hz

(3) 260 Hz (4) 252 Hz

33. Curve 'y–x' at an instant for a wave travelling along x-axis on a string is shown. Slope at the point A on the curve, as shown, is 53°.



(1) Transverse velocity of the particle at point A is positive if the wave is travelling along positive x-axis.

(2) Transverse velocity of the particle at point A is positive if the wave is travelling along negative x-axis

(3) Magnitude of transverse velocity of the particle at point A is lesser than wave speed.

(4) Both (1) & (3)

34. Gravitation field intensity at a distance $\frac{R}{2}$ from centre of the earth is E_0. Here R is the radius of the earth. The earth expands up to radius 2R such that total mass of the earth remains unchanged. Assume earth of uniform density in both cases. What will be the field intensity at a distance $\frac{R}{2}$, from the centre in final situation.

(1) $\frac{E_0}{2}$ (2) $\frac{E_0}{4}$

(3) $\frac{E_0}{8}$ (4) E_0

35. A satellite is moving round the earth with a speed of v in a circular orbit of radius r. If the orbit's radius is reduced by 1% its speed will:-

(1) increase by 1%

(2) increase by 0.5%

(3) decrease by 1%

(4) decrease by 0.5%

SECTION - B (PHYSICS)

36. In elliptical orbit of a planet, as the planet moves from apogee position to perigee position :-

	List - I		**List - II**
(P)	Speed of planet	(1)	Remains same
(Q)	Distance of planet from centre of Sun	(2)	Decreases
(R)	Potential energy of planet	(3)	Increases
(S)	Angular momentum about centre of Sun	(4)	Can not say

(1) P-3; Q-2; R-2; S-1 (2) P-1; Q-2; R-2; S-3

(3) P-3; Q-1; R-2; S-2 (4) P-3; Q-2; R-1; S-2

37. The density of a newly discovered planet is thrice that of earth. The acceleration due to gravity at the surface of the planet is equal to that at the surface of the earth. If the radius of the earth is R, the radius of the planet would be :–

(1) 3R (2) $\frac{R}{3}$ (3) 9R (4) $\frac{R}{9}$

38. **Assertion (A) :-** The graph of total mechanical energy of a particle in SHM w.r.t. position is a straight line with zero slope.
Reason (R) :- Total energy of particle in SHM remains constant throughout its motion.

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

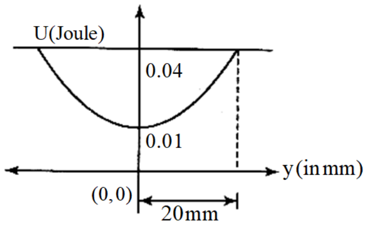
(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

39. Gravitational acceleration on the surface of a planet is $\frac{\sqrt{6}}{11}$ g, where g is acceleration due to gravity on earth. The average mass density of the planet is $\frac{2}{3}$ times that of the earth. If the escape speed on earth surface is 11 km/s, the escape speed on the surface of the planet in km s^{-1} will be

(1) 2 (2) 3 (3) 4 (4) 5

40. The variation of potential energy of harmonic oscillator is as shown in figure. The spring constant is



(1) 1×10^2 N/m

(2) 150N/m

(3) 0.667×10^2 N/m

(4) 3×10^2 N/m

41. A point performs simple harmonic oscillation of time period T and the equation of motion is given by $x = a \sin(\omega t + \frac{\pi}{4})$. After the elapse of what fraction of the time period, the velocity of the point will be equal to half of its maximum velocity ?

(1) $\frac{1}{6}$ (2) $\frac{1}{8}$ (3) $\frac{1}{2}$ (4) $\frac{1}{24}$

42. A mass M is suspended from a spring of negligible mass. The spring is pulled a little and then released so that the mass executes SHM of time period T. If the mass is increased by m, the time period becomes 5T/3. Then the ratio of m/M is :

(1) 3/5 (2) 25/9 (3) 16/9 (4) 5/3

43. If T_1, T_2, T_3, T_4 and T_5 represent the tension in the string of a simple pendulum when the bob is at the left extreme, right extreme, mean, any intermediate left and any intermediate right positions, respectively. Then which of the following relations are correct ?

(A) $T_1 = T_2$ (B) $T_3 > T_2$
(C) $T_4 > T_3$ (D) $T_3 = T_4$
(E) $T_5 > T_2$

Choose the **most appropriate answer** from the options given below :

(1) B, C and D only (2) A, B and E only

(3) C, D and E only (4) A, B and C only

44. Energy needed for moving a mass of 2kg from the centre of the earth to its surface will be (in joule) (R is radius of earth in m, g is in m/sec^2)

(1) gR (2) $\frac{3}{2}$gR

(3) $\frac{gR}{2}$ (4) 2gR

45. The mathematical forms for three sinusoidal travelling waves are given by

Wave 1 : y(x,t) = (2cm) sin(3x–6t)
Wave 2 : y(x,t) = (3cm) sin(4x–12t)
Wave 3 : y(x,t) = (4cm) sin(5x–11t)

Where x is in meters and t is in seconds. Out of these waves :

(1) wave 1 has the greatest wave speed and the greatest maximum transverse string speed.

(2) wave 2 has the greatest wave speed and wave 1 has the greatest maximum transverse string speed.

(3) wave 3 has the greatest wave speed and the greatest maximum transverse string speed.

(4) wave 2 has the greatest wave speed and wave 3 has the greatest maximum transverse string speed.

46. **Assertion** : In stationary wave, there is no net transfer of energy.
Reason : The ratio of kinetic energy to potential energy is independent of the position.

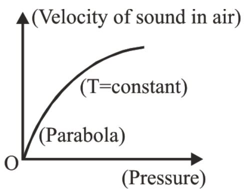
(1) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.

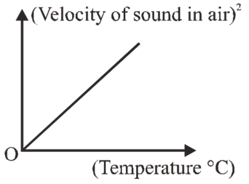
(2) **Assertion** is true but **Reason** is false.

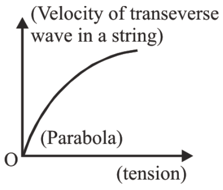
(3) **Assertion** is false but **Reason** is true.

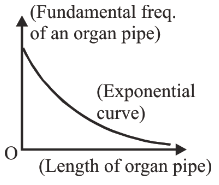
(4) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

47. Which of the following is correct ?

(1)


(2)


(3)


(4)


48. Intensity level, 20 cm from a source of sound is 80 dB. If there is no loss of acoustic power in air and intensity of threshold hearing is 10^{-12} Wm^{-2} then what is the intensity level at a distance of 400 cm from source :–

(1) zero (2) 54 dB

(3) 64 dB (4) 44 dB

49. There is a set of 4 tuning forks, one with lowest frequency vibrating at 552 Hz. By using any two forks at time, the beat frequencies heard are 1, 2, 3, 5, 7, 8. The possible frequencies of other three forks are :-

(1) 553, 554 and 560 Hz

(2) 553, 555 and 560 Hz

(3) 553, 556 and 558 Hz

(4) 551, 554 and 560 Hz

50. Match the following columns

	Column I		Column II
(A)	$y = 5\cos(4x)\sin(20t)$	(P)	a travelling wave along –x direction
(B)	$y = 10\cos(2\pi t)\cos(502\pi t)$	(Q)	a standing wave
(C)	$y = 4\sin(5x-t/2) +3\cos(5x-t/2)$	(R)	Beats
(D)	$y = 100\cos(10\pi t+0.5x)$	(S)	Superposition of two progressive wave
		(T)	Superposition of two stationary wave

(1) A⟶R, B⟶Q, C⟶S, D⟶P

(2) A⟶Q, B⟶R, C⟶T, D⟶P

(3) A⟶R, B⟶Q, C⟶T, D⟶P

(4) A⟶Q, B⟶R, C⟶S, D⟶P

SECTION - A (CHEMISTRY)

51. Which of the following molecules has the maximum number of A–X bonds of identical length, where 'A' is the central atom and 'X' is the surrounding atom :-

(1) SF_6

(2) IF_7

(3) PF_5

(4) ClO_4^-

52. In the structure of ClF_3 the number of electrons of lone pair on central atom of Cl is/are

(1) Four

(2) Two

(3) One

(4) Three

53. Total number of orbitals of sulphur used when it undergoes formation of SF_4:

(1) 5 (2) 4 (3) 3 (4) 2

54. **Assertion (A) :** Among H_2O, H-F, NH_3, H_2O is having maximum boiling point.
Reason (R) : Boiling point depends upon strength of H-bonding.

(1) A & R both are correct & R is correct explanation of A.

(2) A & R both are incorrect

(3) A is correct but R is incorrect

(4) Both A & R are correct but R is not correct explanation of A.

55. Which of the following is the correct order of relative O–O bond stability :-

(1) $O_2^+ > O_2 > O_2^- > O_2^{-2}$

(2) $O_2^{-2} > O_2 > O_2^- > O_2^+$

(3) $O_2^{-2} > O_2^- > O_2 > O_2^+$

(4) $O_2 > O_2^{-2} > O_2^+ > O_2^-$

56. Which of the following is the correct order of dipole moment :-

(1) $CCl_4 > NH_3 > NF_3$

(2) $CO_2 > SO_2 > H_2O$

(3) HF > HCl > HBr > HI

(4) $NH_3 > PCl_5 > H_2O$

57. **Statement-I:** HCl is more volatile than HF.
Statement-II: Boiling point of HCl is less than HF.

(1) Both statement-I and statement-II are correct.

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct and statement-II is incorrect

(4) Statement-I is incorrect and statement-II is correct

58. Which of the following order of bond strength is not correct ?

(1) Diamond < Graphite (C – C bond)

(2) $SO_2 > SO_3^{-2} > SO_4^{-2}$ (S – O bond)

(3) $N_2 > N_2^+ > N_2^-$ (N – N bond)

(4) $ClO_3^- < ClO_4^-$ (Cl – O bond)

59. How many of the following are planar ?
XeF_2, ClF_3, H_2O, $[XeF_5]^-$, I_3^-, BCl_3, XeF_4, SF_4, PCl_5, SF_6, IF_7.

(1) 6 (2) 7 (3) 5 (4) 4

60. Which molecule does not contain π-bond :-

(1) H_2O (2) SO_2

(3) NO_2 (4) CO_2

61. The correct order of decreasing bond energy is:-

(1) O–O > S – S > Se – Se

(2) C – C > Si – Si > Ge – Ge

(3) F – F > O – O > N – N

(4) F – F > Cl – Cl > Br – Br

62. In which molecule all bonds are π bonds

(1) B_2 (2) C_2

(3) N_2 (4) Both (1) and (2)

63. **Assertion (A) :** Dipole moment of CH_4 and BF_3 are zero.
Reason (R) : Both have same geometry.

(1) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

(2) Both **Assertion** and **Reason** are true but **Reason** is not the correct explanation of **Assertion**.

(3) **Assertion** is true but **Reason** is false.

(4) Both **Assertion** & **Reason** are false.

64. Which given order of boiling point is wrong :-

(1) HF > HI > HBr > HCl

(2) $SbH_3 > NH_3 > AsH_3 > PH_3$

(3) $H_2O > H_2Te > H_2Se > H_2S$

(4) $CH_4 > SiH_4 > GeH_4 > SnH_4$

65. Shape of molecule having 4-bond pair and one lone pair on central atom is -

(1) Trigonal bipyramidal

(2) T-Shape

(3) See-saw

(4) Square planar

66. Match the column :-

Compound		Shape	
(a)	XeO_2F_2	(P)	Trigonal-Bi-Pyramidal
(b)	XeF_5^-	(Q)	Linear
(c)	XeO_3F_2	(R)	See-Saw
(d)	XeF_2	(S)	Pentagonal Planar

	(a)	(b)	(c)	(d)
(1)	R	S	P	Q
(2)	R	S	Q	P
(3)	P	S	Q	R
(4)	S	Q	P	R

67. Which of the following has maximum pπ-dπ bond :

(1) CO_2 (2) SO_3

(3) XeO_4 (4) XeO_2

68. Which one of the following is a correct pair with respect to molecular formula of xenon compound and hybridization state of xenon in it :

(1) XeF_4 ,sp^3 (2) XeF_2 ,sp

(3) XeF_2 ,sp^3d (4) XeF_4 ,sp^2

69. Which of the following pair is expected to have the same bond order?

(1) O_2, N_2 (2) O_2^+,N_2^-

(3) O_2^-, N_2^+ (4) O_2^-, N_2^-

70. Which one is the correct order of stability with respect to MOT

(1) $N_2 > C_2$ (2) $B_2 > O_2$

(3) $N_2 < C_2$ (4) $N_2 < O_2$

71. The longest bond length is present in :

(1) C–H (2) Si–H

(3) N–H (4) P–H

72. In the following chemical reaction :-

$MnO_2 + KOH + O_2 \longrightarrow$ 'X' + other

↓

(compound of Mn)

Incorrect regarding 'X' is

(1) 'X' is green in colour

(2) 'X' is paramagnetic in nature

(3) 'X' has tetrahedral shape

(4) In 'X' Mn has +7 oxidation state

73. Highest stable Mn fluoride is MnF_4 where as highest Mn oxide is Mn_2O_7 due to–

(1) O atom is smaller the F

(2) Oxygen has ability to form multiple bonds

(3) Mn^{7+} does not exist

(4) F can not-stabilise higher oxidation states

74. Select the incorrect statements

(1) In K_2MnO_4 and CrO_2Cl_2, the central transition metals have the same oxidation state

(2) Both sodium and potassium dichromate can be used as primary standard in volumetric estimations

(3) Potassium dichromate on strong heating evolves oxygen gas

(4) MnO_2 on fusion with KOH in presence of oxygen gives green coloured compound

75. Which of the following acts as strongest reducing agent ?

(1) Cr^{+2}

(2) Co^{+2}

(3) Mn^{+2}

(4) V^{+2}

76. Which of the following electronic configuration represents f-block element :-

(1) [Rn] $5f^{14}$ $6d^{10}$ $7s^2$ $7p^6$

(2) [Rn] $5f^0$ $6d^1$ $7s^2$ $7p^0$

(3) [Rn] $5f^0$ $6d^0$ $7s^2$ $7p^0$

(4) [Rn] $5f^0$ $6d^2$ $7s^2$ $7p^0$

77. Which have highest enthalpy of atomisation in following ?

(1) V (2) Mn (3) Zn (4) Sc

78. Which of the following can not decolourise acidified $KMnO_4$.

(1) SO_2

(2) $I^{\ominus}$

(3) CO_2

(4) $FeSO_4$

79. In following pairs, the one in which both transition metal ions are colourless is:

(1) Sc^{3+}, Zn^{2+} (2) Ti^{4+}, Cu^{2+}

(3) V^{2+}, Ti^{3+} (4) Zn^{2+},Mn^{2+}

80. Which reaction is not disproportion reaction ?

(1) MnO_4^{2-} forms MnO_4^- and MnO_2 in acidic medium

(2) Cu^+(aq) converts into Cu^{+2}(aq) and metallic copper

(3) XeF_4 on hydrolysis forms Xenon and Xenon oxide

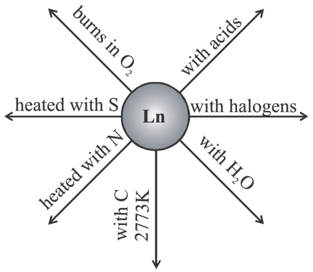
(4) $K_2Cr_2O_7$ decompose into K_2CrO_4 and dichromium trioxide on heating

81. Which of the following ion is tetrahedral and green coloured.

(1) MnO_4^- (2) CrO_4^{2-}

(3) MnO_4^{2-} (4) $Cr_2O_7^{2-}$

82. The number of gaseous product(s) are formed on the basis of following reactions :



(Chemical reactions of the lanthanoids)

(1) 1 (2) 2 (3) 3 (4) 4

83. Which of the following element show + 7 oxidation state?

(1) Cl (2) Mn

(3) Np (4) All of these

84. HCl can be oxidised by :-

(1) $KMnO_4$

(2) Br_2

(3) Conc. H_2SO_4

(4) 1 & 3

85. The product of oxidation of $I^{\ominus}$ with MnO_4^- in weak alkaline medium is :-

(1) IO_3^- (2) I_2 (3) IO^- (4) IO_4^-

SECTION - B (CHEMISTRY)

86. Which one of the following conversion involves change in both hybridisation and shape.

(1) $CH_4 \longrightarrow C_2H_6$

(2) $NH_3 \longrightarrow NH_4^+$

(3) $BF_3 \longrightarrow BF_4^-$

(4) $H_2O \longrightarrow H_3O^+$

87. Phosphate of a metal M has the formula $M_3(PO_4)_2$. The formula for its sulphate would be -

(1) MSO_4 (2) $M(SO_4)_2$

(3) $M_2(SO_4)_3$ (4) $M_3(SO_4)_2$

88. Which of the following bond angle order is correct :-

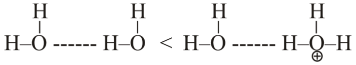
(1) $BCl_3 > PCl_3 > AsCl_3$

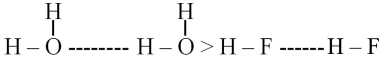
(2) $SF_2 < NH_3 < BF_3 < CO_2$

(3) $OF_2 < H_2O < CH_3–O–CH_3$

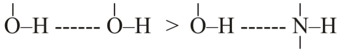
(4) All of above are correct order

89. Which of the following order of H-bond strength is correct :-

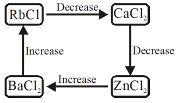
(1) 
$\text{H}-\overset{\overset{\text{H}}{|}}{\text{O}}\ \text{------}\ \text{H}-\overset{\overset{\text{H}}{|}}{\text{O}} < \text{H}-\overset{\overset{\text{H}}{|}}{\text{O}}\ \text{------}\ \text{H}-\underset{\oplus}{\overset{\overset{\text{H}}{|}}{\text{O}}}-\text{H}$

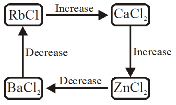
(2) 
$\text{H}-\overset{\overset{\text{H}}{|}}{\text{O}}\ \text{--------}\ \text{H}-\overset{\overset{\text{H}}{|}}{\text{O}} > \text{H}-\text{F}\ \text{------}\ \text{H}-\text{F}$

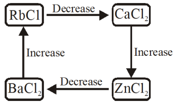
(3) H–F ------ H–F = $F^{\ominus}$ ------ H–F

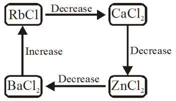
(4) 
$\overset{|}{\text{O}}-\text{H}\ \text{------}\ \overset{|}{\text{O}}-\text{H} > \overset{|}{\text{O}}-\text{H}\ \text{------}\ \underset{|}{\overset{|}{\text{N}}}-\text{H}$

90. Which of the following diagram show correct change in the ionic character of given compounds according to Fajans rule ?

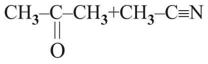
(1) 

(2) 

(3) 

(4) 

91. Match the column :-

(A)	$NO_3^- + HCl$	(p)	Kessome attraction
(B)	$Xe + H_2O$	(q)	Debye attraction
(C)	 $CH_3-\underset{\underset{O}{\Vert}}{C}-CH_3 + CH_3-C\equiv N$	(r)	London force
(D)	$CO_2 + CS_2$	(s)	Ion-dipole attraction

(1) A-s, B-q, C-p, D-r (2) A-q, B-s, C-p, D-r

(3) A-s, B-p, C-q, D-r (4) A-s, B-q, C-r, D-p

92. In the reaction $BF_3 + NH_3 \rightarrow F_3B.NH_3$

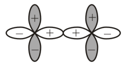
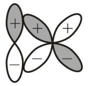
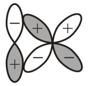
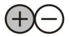
(1) Bond angle F – B – F increase

(2) $H\hat{N}H$ bond angle decrease

(3) regular geometry of BF_3 is changed

(4) regular geometry of NH_3 is changed.

93. Match the orbital overlap figures shown in List-I with the description given in List-II and select the correct answer using the code given below the lists.

	List-I		List-II
(P)		(1)	p – d (π antibonding)
(Q)		(2)	d – d (σ bonding)
(R)		(3)	p – d (π bonding)
(S)		(4)	s – s (σ antibonding)

Code :

	P	Q	R	S
(1)	2	1	3	4
(2)	4	3	1	2
(3)	2	3	1	4
(4)	4	1	3	2

94. Correct order of polarisation is

(1) AgF < AgCl < AgBr < AgI

(2) PbO < PbS

(3) LiF < LiCl < LiBr < LiI

(4) All are correct

95. Chromite ore $\xrightarrow{Na_2CO_3+O_2} A \underset{[NaOH]}{\overset{H_2SO_4}{\rightleftharpoons}} B$

Correct among the following are

(1) $A = Cr_2O_4^{2-}$ (2) $B = Na_2Cr_2O_7$

(3) $A = Na_2CrO_4$ (4) Both (2) & (3)

96. White vitriol is :-

(1) ZnS (2) $ZnSO_4$

(3) $ZnSO_4.7H_2O$ (4) $ZnCO_3$

97. Which of the following is correct ?

(1) Rust is – $FeO + Fe(OH)_2$

(2) Stability $MnO_4^- < TcO_4^-$

(3) Fe & Hg can form alloy

(4) Lowest M.P. among d-block = W

98. Many transition metals form intersitial compounds. The characteristics of these interstitial compounds are :

(I) They have high melting points, higher than those of pure metals

(II) They are very hard

(III) They retain metallic conductivity

(IV) They are chemically more reactive than the pure metals

(1) I, II, III (2) I, III

(3) II, IV (4) Only IV

99. The common positive oxidation states for an element with atomic number 24 are.

(1) +3 and +6 (2) +1 and +3 to +6

(3) +1 and +3 (4) +1 to +6

100. The covalent oily green compound is ?

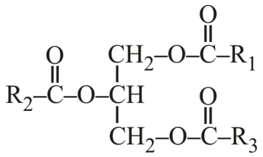
(1) CrO (2) MnO

(3) Mn_2O_7 (4) Fe_2O_3

Biomolecule with Enzyme

SECTION - A (BOTANY)

101. In the given structure R_1, R_2 and R_3 are part of :-



(1) Nitrogen bases (2) Fatty acids

(3) Nucleosides (4) Lecithin

102. In a protein chain, the first amino acid is called :-

(1) N-terminal amino acid

(2) C-terminal amino acid

(3) F-terminal amino acid

(4) L-terminal amino acid

103. Monomeric unit of inulin is :-

(1) Glucose

(2) Fructose

(3) Galactose

(4) Xylose

104. Which is the most abundant chemical in living organisms ?

(1) Protein

(2) Lipid

(3) Water

(4) Carbohydrate

105. Which of the following statements is **correct** ?

(1) Saturated fatty acids have one or more C=C double bonds.

(2) Oils have higher melting point hence remain as oil in winter

(3) Arachidonic acid has 20 carbon atoms including the carboxyl carbon

(4) Cell wall in fungi is made up of phospholipids in which lipids have phosphorylated organic compounds.

106. Which of the following is **incorrect** ?

(1) All the elements present in a sample of earth's crust are also present in a sample of living tissue

(2) The relative abundance of carbon and hydrogen with respect to other elements is higher in any living organism than in earth's crust

(3) The percentage weight of nitrogen in earth's crust is very high in comparison to human body

(4) The percentage weight of silicon in earth's crust is high in comparison to human body

107. Match the following :-

	Column-I		Column-II
(A)	Toxin	(i)	Vinblastin
(B)	Drug	(ii)	Concanavalin A
(C)	Pigment	(iii)	Abrin
(D)	Lectin	(iv)	Anthocyanin

Options :-

(1) A-iii, B-ii, C-iv, D-i

(2) A-iii, B-i, C-iv, D-ii

(3) A-ii, B-i, C-iv, D-iii

(4) A-ii, B-iii, C-i, D-iv

108. The correct order of chemical composition of living tissues/cells in term of percentage of the total cellular mass is :-

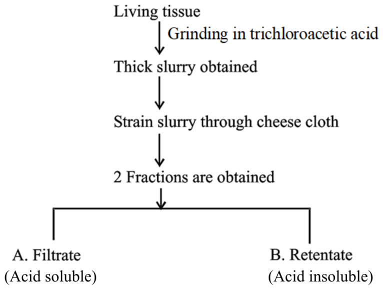
(1) Nucleic acid > Proteins > H_2O > Carbohydrates > Ions > Lipids

(2) H_2O > Proteins > Nucleic acid > Carbohydrates > Lipids > Ions

(3) H_2O > Proteins > Carbohydrates > Nucleic acid > Lipids > Ions

(4) Lipids > Ions > Carbohydrates > H_2O > Proteins > Nucleic acid

109.



I. Molecular weight less than 1000 Dalton

II. Presence of four type of organic compounds proteins, nucleic acids, polysaccharides and lipids

III. Presence of chemicals that have molecular weight more than 1000 Dalton

IV. Contains monomers

V. Contains polymers [exception-lipids]

VI. Mostly micromolecules

VII. Generally macromolecules

Which of the above statements (I-VII) are **correct** regarding A & B respectively ?

	A	B
(1)	I, II, III	IV, V, VI, VII
(2)	II, IV, VI	I, III, V, VII
(3)	I, IV, VI	II, III, V, VII
(4)	I, III, V	II, IV, VI, VII

110. Most of the enzymes are made up of –

(1) Polynucleotides (2) Polypeptides

(3) Polysaccharides (4) Polythene

111. Protein part of a conjugate enzyme is known as :-

(1) Apoenzyme (2) Coenzyme

(3) Prosthetic group (4) Cofactor

112. Enzymes .... the activation energy of substrate molecule(s) :–

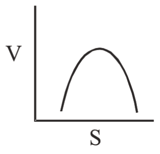
(1) Increase

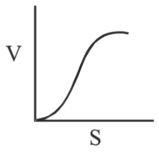
(2) Decrease

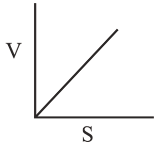
(3) Do not alter

(4) First increase then decrease

113. Which one of the following graphs shows the relationship between the velocity of an enzymatic activity (V) and substrate concentration (S) ?

(1)


(2)


(3)


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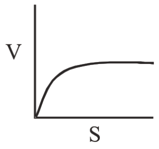


114. Coenzyme is a non protein part of enzyme, it is :-

(1) Loosely attached organic part

(2) Tightly attached organic part

(3) Loosely attached inorganic part

(4) Tightly attached inorganic part

115. **Assertion :** With the increase in substrate concentration the velocity of the enzymatic reaction rises at first, the reaction ultimately reaches a maximum velocity which is not exceeded by any further rise in concentration of the substrate.

Reason : Usually enzyme molecules are more than the substrate molecules and after saturation of substrate molecules there is no free substrate molecule to bind with the additional enzyme molecules.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

116. **A.** Catalyses the transfer of any group (other than hydrogen) between a pair of substrates.

B. Catalyses removal of groups, from substrates by mechanism other than hydrolysis leaving double bond.

C. Catalyzing the linking of 2 molecules.

Identify the classes of enzymes for above functions :-

	A	B	C
(1)	Ligases	Lyases	Transferases
(2)	Transferases	Lyases	Ligases
(3)	Lyases	Ligases	Transferases
(4)	Transferases	Ligases	Lyases

117. **(A)** Metal ions are co-factors which form coordination bonds with side chains at the active site and at the same time form one or more coordination bonds with the substrate

(B) Co-enzymes are organic compounds and their association with the apoenzyme is permanent.

(1) Both (A) and (B) are correct

(2) Both (A) and (B) are incorrect

(3) Only (A) is correct

(4) Only (B) is correct

118. Enzymes are biocatalysts that catalyse reactions at very high rates compared to the chemical catalysts. A few statements about enzymes are given here :-

(I) Not every enzyme is proteinaceous in nature.

(II) Some nucleic acids also are enzymes.

(III) The active site of the enzyme is specific for substrate.

(IV) Enzymes catalyse only irreversible reactions

Which of the above statements are **correct** ?

(1) (I), (II) and (III)

(2) (II), (III) and (IV)

(3) Only (III) and (IV)

(4) (I), (II) and (IV)

119. Arithmetic growth includes all, except :-

(1) Constant growth rate

(2) It is found in root and shoot apics cells

(3) It is expressed as $L_t = L_o + rt$

(4) Its characteristic graph is sigmoid

120. During differentiation, cell undergoes structural changes in their :-

(1) Cell wall only

(2) Protoplasm only

(3) Cell membrane only

(4) Cell wall and protoplasm

121. Hormone that is associated with the chloroplast formation is -

(1) Auxin

(2) Cytokinin

(3) ABA

(4) Gibberellin

122. Environmental heterophylly is observed in :-

(1) Cotton

(2) Buttercup (*Ranunculus*)

(3) Coriander

(4) *Larkspur*

123. During drought condition or desiccation, plant produce a hormone known as :-

(1) IAA

(2) Ethylene

(3) ABA

(4) IBA

124. Which of the following growth regulators can fit either of the group (promoter or inhibitor)?

(1) C_2H_4

(2) ABA

(3) GA

(4) IAA

125. Hormone, that promotes the growth of lateral buds and has negative effect on apical dominance, is :
(1) Cytokinin
(2) Gibberellin
(3) Auxin
(4) ABA

126. The conditions/factors which influence growth are :-
(1) Nutrients (2) Water, oxygen
(3) Light, temperature (4) All of these

127. Which is/are redifferentiated cell(s)?
(1) Cork
(2) Secondary cortex
(3) Both (1) and (2)
(4) Primary xylem

128. **Assertion:** Within the plant body the cell or tissues arising out of the same meristem have different structure at maturity.
Reason: The final structure at maturity of a cell or tissue is also determined by the location of the cell within the plant body.
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

129. **Statement-I :** In plant growth, the role of PGR is one kind of extrinsic control.
Statement-II : Along with genomic control and extrinsic factors, PGR play an important role in plant growth and development.
(1) Statement-I and II both are correct.
(2) Statement-I and II both are incorrect.
(3) Only Statement-I is correct.
(4) Only Statement-II is correct.

130. Match column-I with Column-II and select correct option :-

	Column-I		Column-II
A	Natural auxin	I	ABA
B	Stress hormone	II	GA_3
C	Common gibberellin	III	Zeatin
D	Natural cytokinin	IV	IBA

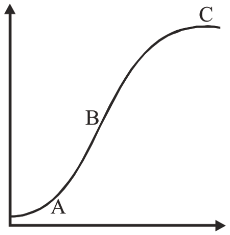
Options :-
(1) A-I, B-II, C-III, D-IV
(2) A-IV, B-I, C-II, D-III
(3) A-II, B-III, C-I, D-IV
(4) A-IV, B-I, C-III, D-II

131. Find the **correct** match :-

(1)	Auxin	Apical dominance
	Gibberellin	Flowering in pineapple
	Cytokinin	Fruit ripening
	ABA	Promotes Seed dormancy
(2)	Auxin	Parthenocarpy
	Gibberellin	Bolting
	Cytokinin	Promotion of nutrient mobilisation
	ABA	Closure of stomata
(3)	Auxin	Malting
	Gibberellin	Herbicide
	Cytokinin	Flowering in mango
	ABA	Overcomes apical dominance
(4)	Auxin	Fruit ripening
	Gibberellin	Closure of stomata
	Cytokinin	Parthenocarpy
	ABA	Bolting

132. Which of the following is **not correct** for ethylene?
(1) Promotes horizontal growth in seedlings
(2) Synchronize fruit set in pineapple
(3) Does not help to increase absorption surface of root
(4) Break seed and bud dormancy

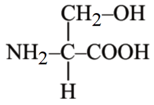
133. Which of the following statements is **incorrect** ?
(1) Increased vacuolation is one of the characteristics of elongation phase of growth
(2) Sigmoid growth curve is characteristic representation of organism's growth in natural conditions
(3) Development is considered as the sum of growth and differentiation
(4) Plant growth regulators are extracellular factors for growth

134.


Choose **incorrect** for given diagram :-
(1) **A** - Slow growth rate
(2) **B** - Rapid growth rate
(3) **C** - Nutrition unlimited
(4) **B** - Depends upon metabolism

135. How many of following functions are **not** related to gibberellins ?
Internode elongation, malting, bolting, promotion of abscission, promotion of apical dominance, increasing yield of sugarcane, promote seed dormancy.
(1) 2 (2) 3
(3) 4 (4) 5

SECTION - B (BOTANY)

136. Identify the given structure :-


$$NH_2-\overset{\overset{\displaystyle CH_2-OH}{|}}{\underset{\underset{\displaystyle H}{|}}{C}}-COOH$$

(1) Glycine
(2) Alanine
(3) Valine
(4) Serine

137. The primary structure of protein is maintained by:-
(1) Peptide bond
(2) Hydrogen bond
(3) Ionic bond
(4) Hydrophobic bond

138. Match the column A to B :-

	Column-A		Column-B
(P)	Palmitic Acid	(i)	Basic amino acid
(Q)	Lecithin	(ii)	Aromatic amino acid
(R)	Phenyl Alanine	(iii)	Fatty Acid
(S)	Lysine	(iv)	Phospholipid

Options :-
(1) P-iii Q-iv R-ii S-i
(2) P-i Q-ii R-iii S-iv
(3) P-i Q-ii R-iv S-iii
(4) P-iv Q-iii R-ii S-i

139. The activity of an enzyme can be affected by a change in the conditions, which can alter the :-
(1) Tertiary structure of nucleic acids
(2) Primary structure of fats
(3) Tertiary structure of proteins
(4) Secondary structure of carbohydrates

140. Malonic acid/Malonate is a competitive inhibitor for a dehydrogenase enzyme because its structure closely resembles to :-

(1) Citric acid

(2) Succinic acid

(3) Malic acid

(4) Oxaloacetic acid

141. The steps of catalytic cycle of an enzyme action are given in random order :-

(I) The enzyme releases the product, now, enzyme is free to bind with another substrate

(II) The active site, now in close proximity of substrate, breaks the bond of substrate and E-P complex forms

(III) Binding of substrate induces the enzyme to alter its shape fitting more tightly around the substrate

(IV) The substrate binds to the active site of the enzyme, fitting into the active site.

The **correct order** is :

(1) I, II, III, IV (2) IV, III, II, I

(3) I, III, II, IV (4) I, II, IV, III

142. **(a)** Mo is the cofactor for the proteolytic enzyme carboxy peptidase

(b) Enzyme's catalytic activity is lost when cofactor is removed from the enzyme

(c) Prosthetic groups are only inorganic compounds

(d) Co-enzyme serve as co-factor in a number of different enzyme catalysed reactions

Which of the above statements are **correct**?

(1) a, b and c (2) only c

(3) a, b, c and d (4) b and d

143. Which process is **not** directly affected by auxin?

(1) Apical dominance

(2) Parthenocarpy

(3) Synthesis of α-amylase by barley seeds

(4) Root initiation in stem cutting

144. Cytokinin helps in delay of leaf senescene by :-

(1) Increasing more water absorption by root

(2) Increasing rate of cell elongation

(3) promoting nutrients mobilization

(4) formation of adventitious buds

145. Seed dormancy is caused by :-

(1) C_2H_4 (2) ABA

(3) IAA (4) GA_3

146. Auxin and cytokinin are antagonistic in which of the following functions ?

(1) Cell division

(2) Phototropism

(3) Apical dominance

(4) Parthenocarpy

147. The removal of shoots tips (decapitation) means loss of apical dominance and it is widely applied in :-

(1) Tea plantation

(2) Hedge making

(3) Both (1) and (2)

(4) Bolting

148. Match column-I with column-II :-

Column-I		Column-II	
(I)	IAA	(A)	Terpenes
(II)	GA	(B)	Indole compounds
(III)	ABA	(C)	Adenine derivatives
(IV)	Kinetin	(D)	Carotenoid derivatives

The **correct match** is :-

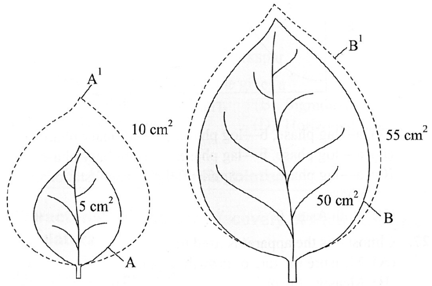
(1) I - B, II - D, III - A, IV - C

(2) I - B, II - A, III - D, IV - C

(3) I - C, II - A, III - D, IV - B

(4) I - D, II - B, III - A, IV - C

149. Two leaves, A and B are of different sizes but shows absolute increase in area in the unit time results in A^1 and B^1. Find out the absolute growth and relative growth rate of both the leaves.



	Absolute growth of A	Absolute growth of B	Relative growth rate of A	Relative growth rate of B
(1)	5 cm^2	10 cm^2	10%	50%
(2)	10 cm^2	5 cm^2	5%	10%
(3)	5 cm^2	5 cm^2	10%	100%
(4)	5 cm^2	5 cm^2	100%	10%

150. **(I)** O_2 helps in releasing metabolic energy essential for growth activities

(II) Nutrients are required by plants for the synthesis of protoplasm as well as act as source of energy

(III) Optimum temperature for plant growth is needed

(IV) Environmental signals like light and gravity affect certain phases of growth

Choose the **correct** option :-

(1) All statements are correct

(2) Only statements I, II and III are correct

(3) Only statements I, II and IV are correct

(4) Only statements I and IV are correct

Gases (Respiratory System), Body Fluids And Circulation

SECTION - A (ZOOLOGY)

151. What percentage of CO_2 is transported by RBCs?

(1) 7% (2) 70%

(3) 97% (4) 20–25%

152. Right shifting of oxygen dissociation curve indicate:-

(1) Increase of PO_2

(2) Decrease in temperature

(3) Increase in PCO_2

(4) High pH

153. Hamburger's phenomena is :-

(1) Movement of HCO_3^- from plasma to RBC and Cl^- from RBCs to plasma

(2) Movement of HCO_3^- from RBC's to plasma and Cl^- from plasma to RBC

(3) Diffusion of CO_2 into alveoli

(4) Outflux of HCO_3^- and influx of K^+

154. Asthma is a condition in which :-

(1) Difficulty in breathing

(2) Breathing causing wheezing

(3) Inflammation of bronchi and bronchioles

(4) All of these

155. Chronic disorder in which alveolar wall are damaged due to which respiratory surface is decreased :-

(1) Bronchitis (2) Asthma

(3) Tuberculosis (4) Emphysema

156. In each 100 ml of oxygenated blood :-

(A) 3% of O_2 is dissolved in blood plasma

(B) 97% of O_2 is bound to haemoglobin

(C) 7% of CO_2 is dissolved in blood plasma

(D) 23% of CO_2 is bound to haemoglobin

(1) A and B (2) B and C

(3) C and D (4) A and D

157. If a person exhales forcefully by applying all his efforts. What will the pulmonary volume inhaled by him immediately under normal condition without applying any extra effort?

(1) TV + IRV (2) TV only

(3) TV + ERV (4) TV + IRV + ERV

158. Functional residual capacity is :-

(1) Volume of air remains in the lungs after forcible expiration.

(2) Volume of air remains in the lungs after normal expiration.

(3) TV + ERV

(4) Both 2 and 3

159. Total lung capacity is :-

(1) total volume of air accommodated in lungs at the end of forced inspiration

(2) RV + ERV + TV + IRV

(3) vital capacity + residual volume

(4) All of the above

160. By the contraction in radial muscle of diaphragm it become flattened in shape, so, volume of thoracic cavity increases in :-

(1) Anterior-posterior axis (2) Dorsal-ventral axis

(3) Anterior-lateral axis (4) Dorsal - lateral axis

161. pO_2 in oxygenated blood is :-

(1) 40 mm of Hg (2) 45 mm of Hg

(3) 104 mm of Hg (4) 95 mm of Hg

162. When alveolar air is released out, all occurs, except one. Choose that one :-

(1) Volume of thorax decreased

(2) Diaphragm relaxed and arched upwards

(3) Ribs and sternum raised

(4) Ribs and sternum returned to original position

163. Intercostal Muscles occur in :-

(1) Abdominal cavity (2) Thigh

(3) Ribs (4) Diaphragm

164. Read the following statements :-

(A) Relaxation of diaphragm and external inter costal muscles.

(B) Intra pulmonary pressure is higher than atmospheric pressure.

The above statements are related with

(1) Inspiration (2) Expiration

(3) Above both (4) Respiration

165. Primary sites of exchange of gases are :

(1) Alveoli (2) Tissue

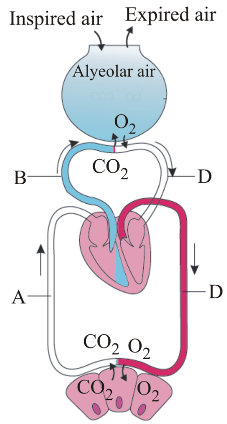
(3) Terminal bronchiole (4) Initial bronchiole

166. Respiratory rhythm centre is located in:

(1) Cerebum (2) Pons

(3) Medulla (4) Hypothalamus

167. The given figure shown diagrammatic representation of exchange of gases at the alveolus and the body tissues with blood and transport of oxygen and carbon dioxide. Identify the blood vessels A to D:



(1) A - Systemic vein, B - Pulmonary artery , C - Pulmonary vein, D - Systemic artery

(2) A - Systemic artery, B - Pulmonary artery C - Pulmonary vein, D - Systemic vein

(3) A - Pulmonary artery, B - Systemic vein C - Pulmonary vein, D - Systemic artery

(4) A - Systemic vein, B - Pulmonary vein C - Pulmonary artery, D - Systemic artery

168. Which of the following statement is incorrect-

(1) Larynx is called as sound box.

(2) During swallowing glottis can be covered by a thin elastic cartilagenous flap called epiglottis.

(3) Trachea is a straight tube extending upto mid-thoracic cavity.

(4) Trachea is divided at the level of 6th thoracic vertebra into a right & left primary bronchi.

169. **Assertion :** In the alveoli, dissociation of CO_2 from carbamino-haemoglobin takes place

Reason : In the alveoli PCO_2 is low and PO_2 is high

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

170. **Assertion :** Larynx is also called sound box.

Reason : It is a cartilaginous box which helps in sound production.

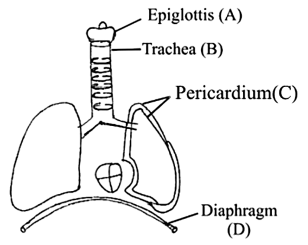
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

171. Which of the following labelling is incorrect ?



(1) A and B (2) B and C

(3) A and D (4) A and C

172. Chemosensitive area situated adjacent to rhythm centre, is highly sensitive to :

(1) CO_2

(2) H^+ ion concentration

(3) O_2

(4) 1 and 2 only

173. Match the column-I and column-II

Column-I		**Column-II**	
(I)	Asthma	(A)	Cigarette Smoking
(II)	Emphysema	(B)	Wheezing
(III)	Occupational respiratory disorders	(C)	Fibrosis

(1) I-B, II-A, III-C

(2) I-A, II-B, III-C

(3) I-B, II-C, III-A

(4) I-C, II-A, III-B

174. Read the following statements and choose that how many of them are incorrect-

(A) Pleural fluid reduces friction on lung surface

(B) Terminal bronchiole have incomplete cartilagenous rings

(C) Relaxation of diaphragm increases thoracic volume

(D) Partial pressure of CO_2 in atmospheric air is 0.03 mmHg

(1) One (2) Two

(3) Three (4) Four

175. Trachea is a straight tube extending up to the mid thoracic cavity, which divide at the level of ______ vertebra into a right and left primary bronchi :-

(1) 5^{th} cervical vertebra

(2) 12^{th} thoracic vertebra

(3) 5^{th} thoracic vertebra

(4) 7^{th} cervical vertebra

176. Read the following statements from A to D

A. All the four chambers of heart are in a relaxed state.

B. The tricuspid and Bicuspid valves are open

C. The semilunar valves are open

D. Blood from the pulmonary veins and vena cava flows into the left and right ventricles respectively through the left and right atria

How many of the above statements are incorrect during joint diastole ?

(1) Four (2) Three

(3) Two (4) One

177. A symptom of acute chest pain, when no enough oxygen is reaching the heart muscle is called -

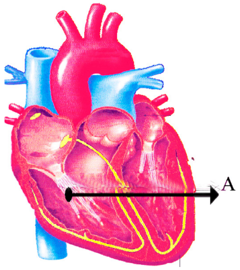
(1) Angina Pectoris

(2) Heart Failure

(3) Atherosclerosis

(4) None of these

178. Identify 'A' in below figure :-



(1) Pupillary muscles

(2) Chordae tendinae

(3) Tricuspid valve

(4) Papillary muscles

179. Which of the following three statements are correct about RBCs in mammals ?

(a) RBCs circulating in the blood have a nucleus.

(b) RBCs have a similar function to WBCs.

(c) RBCs are produced in the bone marrow of some bones

(1) a & b (2) a & c (3) b only (4) c only

180. In heart of Human bicuspid valve is situated in :-

(1) Right auricle and pulmonary aorta

(2) Post caval and auricle

(3) Left auricle and left ventricle

(4) Right auricle and right ventricle

181. Choose the correct pathway of the transmission of impulses in the heart beat :

(1) AV node ⟶ S A node ⟶ Bundle of His ⟶ Purkinje fibres

(2) SA node ⟶ AV node ⟶ Bundle of His ⟶ Purkinje fibres

(3) SA node ⟶ Bundle of His ⟶ AV node ⟶ purkinje fibres

(4) AV node ⟶ Bundle of His ⟶ SA node ⟶ Purkinje fibres

182. Find out the correct match in the following columns.

	Column-I		Column-II
(A)	Life span of RBC	(1)	10-13 days
(B)	Life span of WBC	(2)	120 days
(C)	Life span of platelets	(3)	2-5 days

(1) A-1, B-3, C-1 (2) A-1, B-3, C-2

(3) A-2, B-1, C-3 (4) A-3, B-1, C-2

183. Which of the following organ is termed as graveyard of RBC's ?

(1) Liver (2) Heart (3) Spleen (4) Kidney

184. Identify the correct combination :

	Blood Cells	No. (mm^{-3})	Function
(1)	Erythrocyte	5-5.5 million	transport only CO_2
(2)	Leucocytes	6000-8000	Involved in inflammatory reaction
(3)	Thrombocyte	150,00-350,00	Clotting of blood
(4)	Neutrophils	60-65% of total WBC	Secretion of histamine

185. **Assertion :** Human heart is called myogenic.

Reason : Normal activities of the heart are regulated intrinsically i.e. auto regulated by specialised muscles.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

SECTION - B (ZOOLOGY)

186. In Erythroblastosis foetalis condition _A_ from the mother can leak into the blood of the foetus. This can be avoided by administering _B_ to the mother immediately after the delivery of the first child.

In the above paragraph A and B are :-

	A	B
1	Rh-antigen	Rh-antibody
2	Rh-antibody	Rh-antigen
3	Rh-antibody	Anti-Rh antibodies
4	Anti-Rh antibodies	Rh-antigen

187. The most important muscular structure in respiratory system of human is

(1) External intercostal muscles

(2) Internal intercostal muscles

(3) Diaphgram

(4) Vertebral column

188. Binding of oxygen with haemoglobin is primarily related to :

(1) Partial pressure of CO_2

(2) Hydrogen ion concentration

(3) Partial pressure of O_2

(4) Temperature

189. Total lung capacity is measured by :-

(1) ERV + TV

(2) IRV + RV + ERV + TV

(3) IRV + TV

(4) IRV + ERV + TV

190. Read the following statements :-

(A) Relaxation of diaphragm and inter costal muscles.

(B) Increase in the volume of thoracic chamber

(C) Lifts up the ribs and the sternum

(D) Intra pulmonary pressure is higher than atmospheric pressure.

(E) Increase in the pulmonary volume.

How many statements are correct about expiration

(1) Two

(2) Three

(3) Four

(4) One

191. Partial pressure of oxygen in Alveoli is :-

(1) 40 mmHg

(2) 104 mmHg

(3) 20 mmHg

(4) 95 mmHg

192. **Statement-I :** Volume of inspired air during a normal respiration is tidal volume.

Statement-II : Volume of expired air during a normal respiration is tidal volume.

(1) Both Statement-I & Statement-II are correct

(2) Both Statement-I & Statement-II are incorrect

(3) Only Statement-I is correct

(4) Only Statement-II is correct

193. Match the column :

	Column-I		Column-II
1.	TV	a	IRV + TV
2.	I.C	b	500 ml
3.	E.C	c	ERV + TV
4.	F.R.C.	d	ERV + RV

(1) (1) – (b), (2) – (a), (3) – (c), (4) – (d)

(2) (1) – (a), (2) – (b), (3) – (c), (4) – (d)

(3) (1) – (d), (2) – (c), (3) – (b), (4) – (a)

(4) (1) – (c), (2) – (a), (3) – (d), (4) – (b)

194. **Statement - I :-** In the alveoli, where there is low PO_2, high CO_2, lesser H^+ Concentration and higher temperature, the factors are all favourable for the formation of oxyhaemoglobin.

Statement - II :- In the tissues, where high PO_2, low CO_2, low H^+ concentration and lower temperatures, exist the conditions are favourable for dissociation of oxygen from the oxyhaemoglobin.

(1) Both statements are correct.

(2) Both statements are incorrect.

(3) Statement - I is correct and Statement - II is incorrect.

(4) Statement - I is incorrect and statement - II is correct.

195. Which of the following statement are true regarding transport of oxygen in humans ?

(1) O_2 can bind with haemoglobin in a reversible manner to form oxyhaemoglobin.

(2) Every 100 ml of deoxygenated blood can deliver around 5 ml of O_2 to the tissues under normal physiological conditions.

(3) In the alveoli, where there is high pO_2, low pCO_2, lesser H^+ concentration and higher temperature, the factors are all favorable for the formation of oxyhaemoglobin,

(4) Both 1 and 2

196. Typical 'LUB and DUP' sounds heard during heartbeat are due to :-

(1) Closing of bicuspid and tricuspid valves

(2) Closing of semilunar valves

(3) High blood pressure in aorta

(4) Closure of bicuspid-tricuspid valves and semilunar valves respectively

197. Identify the correctly matched structure :-

(1) Neutrophils ⟶ 3 to 5 lobe nucleus

(2) Eosinophils ⟶ Nucleus absent

(3) Monocytes ⟶ Two lobe nucleus

(4) Erythrocytes ⟶ Horse shoe shaped nucleus

198. Correct for S.A. node is :-

(1) A patch of this tissue is present in the left upper corner of right atrium.

(2) It can generate the maximum number of action potential 70-75 min^{-1}

(3) This tissue is seen in the lower left corner of the right atrium.

(4) This nodal musculature generate action potentials due to external stimuli.

199. Which are not correctly matched from following:-

(a) Stroke volume = 70 ml

(b) Period of vertricular systole = 0.5 sec

(c) End systolic volume = 120 ml

(d) Heart beat rate (normal) = 95/min

(e) Cardiac output = 5000 ml

(f) Normal B.P. = 120/80 mmHg

(g) Normal pulse pressure = 60 mmHg

(1) b, c, d only

(2) b, c, d & e

(3) Only d

(4) b, c, d, & g

200. Find **correct** match in the following column :

	Column-I		Column-II
(A)	Fibrinogen	(1)	Clotting or coagulation of blood
(B)	Globulins	(2)	Defence mechanism of body
(C)	Albumins	(3)	Osmotic balance

(1) A-2 B-1 C-3

(2) A-3 B-2 C-1

(3) A-3 B-1 C-2

(4) A-1 B-2 C-3

NING PROGRAMME
ssion : 2024-2025)

NEET (UG)
TEST # 05
08-12-2024

SERIES / JOINT PACKAGE COURSE
g/Pass Students

IEW TEST # 01

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.
ढ़ें।
is Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1 and Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections. Section A** will consist of 35 questions (all questions are mandatory) and **Section B** will have 15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

ले में, अंग्रेजी संस्करण को अंतिम माना जाएगा।
uestion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature :

Dimension and Measurements, Kinematics, Newton's Laws
ular Motion, Centre of Mass and Collisions, Rotational
Physics (Temperature and Thermal Expansion, Calorimetry,
itation , Oscillations, Wave Motion

SECTION - A (PHYSICS)

1. The position of a particle moving along a straight line is given by $x(t) = \frac{A}{B}(1-e^{-At})$ where A and B are constants. The dimensions of $\frac{A^3}{B}$ is same as

(1) linear momentum (2) moment of inertia

(3) relative velocity (4) acceleration

2. If $\vec{A}$ & $\vec{B}$ are two vectors then which of the following are correct :-

(a) $(\vec{A} \times \vec{B}) \perp \vec{A}$

(b) $(\vec{A} \times \vec{B}) \perp \vec{B}$

(c) $(\vec{A} \times \vec{B}) \perp (\vec{A} + \vec{B})$

(d) $(\vec{A} \times \vec{B}) \perp (\vec{A} - \vec{B})$

(e) $(\vec{A} \times \vec{B}) \perp \vec{A} \cdot \vec{B}$

(1) (a), (b), (c), (d), (e)

(2) (a), (b) only

(3) (a), (b), (c) only

(4) (a), (b), (c), (d) only

3. If a car at rest accelerates uniformly to a speed of 144 km/hr in 20 seconds, it covers a distance of :-

(1) 20 m (2) 400 m

(3) 1440 m (4) 2980 m

4. A body is thrown vertically upwards with a velocity of 100m/s. It travells 5m in the last second of its upward motion. If the same body is thrown vertically upwards with a velocity of 200 m/s, the distance travelled by it in the last second of its motion upward is :-

(1) 1m (2) 3m (3) 5m (4) 7m

5. A projectile is fired with a speed u at an angle θ with the horizontal. Its speed when its direction of motion makes an angle 'α' with the horizontal is

(1) u secθ cosα (2) u secθ sinα

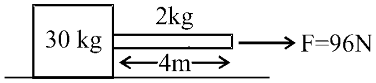
(3) u cosθ secα (4) u sin θ secα

6. A ship is travelling due east at 20 km/h. Find the speed of second ship heading 37° north of east, if it is always due north of the first ship.

(1) 25 km/hr (2) 12.5 km/hr

(3) 50 km/hr (4) 33.3 km/hr

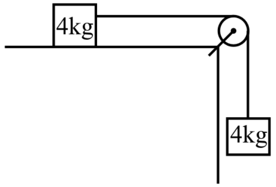
7. A 30 kg body is pulled by a rope 4 m long on a frictionless horizontal surface by a force of 96 N. If mass of the rope is 2 kg, force acting on the block is :



(1) 96 N (2) 94 N

(3) 92 N (4) 90 N

8. In the given arrangement, there is no friction anywhere. Pulley and string are ideal. Acceleration due to gravity is 10 m/s^2 downward. Find out total work done by gravity in 2 sec, if system starts from rest.



(1) 100 J (2) 400 J

(3) 200 J (4) 800 J

9. The potential energy of a particle oscillating along x-axis is given as $U = 20 + (x-2)^2$ where U is in joules and x in meters. Total mechanical energy of the particle is 36 J. Maximum kinetic energy of the particle is :-

(1) 24 J (2) 36 J

(3) 16 J (4) 20 J

10. Which of the following statements are correct.

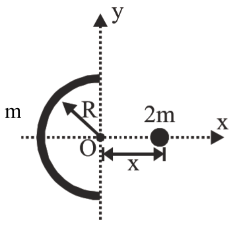
(1) Work done by static friction is always zero

(2) Work done by kinetic friction can be positive.

(3) Kinetic energy of a system cannot be increased without applying any external force on system

(4) Work energy theorem not valid in non−inertial frame.

11. A ring of mass m and a particle of mass 2m are placed as shown in figure. If the centre of mass of the combination lies at origin, the value of x is :-



(1) $\frac{2R}{\pi}$ (2) $\frac{R}{\pi}$ (3) $\frac{R}{2\pi}$ (4) $\frac{2R}{3\pi}$

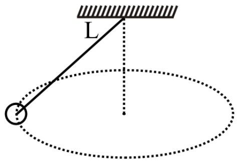
12. A 1.0 kg ball drops vertically on a floor from a height of 25 cm. It rebounds to a height of 4 cm. The coefficient of restitution for the collision is :-

(1) 0.16 (2) 0.32 (3) 0.40 (4) 0.56

13. A particle P is moving in a circle of radius 'a' with a uniform speed υ . C is the centre of the circle and AB is a diameter. When passing through B the angular velocity of P about A and C are in the ratio :-

(1) 1 : 1 (2) 1 : 2 (3) 2 : 1 (4) 4 : 1

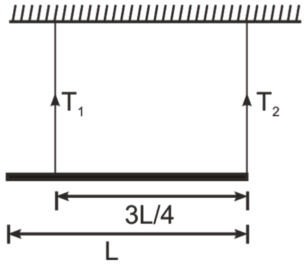
14. A string of length 1 m is fixed at one end and carries a mass 100 g at the other end.The string makes (2/π) revolutions per second around a vertical axis through fixed end. The tension in the string is : (Take g = 10 ms^{-2})



(1) 16 N (2) 1.6 N

(3) 0.16 N (4) none of the above

15. A uniform rod of mass m and length L is suspended with two massless strings as shown in the figure. If the rod is at rest in a horizontal position, the ratio of tension in the two strings T_1/T_2 is:



(1) 1 : 1 (2) 1 : 2 (3) 2 : 1 (4) 4 : 3

16. The ratio of the radii of gyration of a circular disc to that of a circular ring, each of same mass and radius around their geometrical axis passing through centre is :-

(1) $\sqrt{2} : 1$ (2) $\sqrt{2} : \sqrt{3}$

(3) $\sqrt{3} : \sqrt{2}$ (4) $1 : \sqrt{2}$

17. A thin uniform circular disc of mass M and radius 'R' is rotating in a horizontal plane about an axis passing through its center and perpendicular to its plane with an angular velocity ω. Another disc of same dimension but of mass $\frac{M}{4}$ is placed gently on the first disc coaxially. The angular velocity of the system is :-

(1) $\frac{2}{3}\omega$ (2) $\frac{4}{5}\omega$ (3) $\frac{3}{4}\omega$ (4) $\frac{1}{3}\omega$

18. A ring and a disc have same mass and roll without slipping with the same linear velocity v. If the total kinetic energy of the ring is 8 J, the kinetic energy of the disc must be :-

(1) 8 J (2) 16 J (3) 6 J (4) 4 J

19. A body of mass m kg starts falling from a height 2R above the earth surface. Its kinetic energy when it has fallen to a point upto height R above the earth's surface will be –
(Mass of earth is M and its radius is R.)

(1) $\frac{GMm}{2R}$ (2) $\frac{GMm}{6R}$

(3) $\frac{2GMm}{3R}$ (4) $\frac{GMm}{3R}$

20. Two wires of the same material and length but diameters in the ratio 1 : 2 are stretched by the same force. The potential energy per unit volume for the two wires when stretched will be in the ratio.

(1) 16 : 1 (2) 4 : 1

(3) 2 : 1 (4) 1 : 1

21. Two solids A and B float in water. It is observed that A floats with half of its volume immersed and B floats with 2/3 of its volume immersed. The ratio of densities A and B is

(1) 4 : 3 (2) 2 : 3

(3) 3 : 4 (4) 1 : 3

22. Sixty four spherical rain drops of equal size are falling vertically through air with a terminal velocity 1.5 ms^{-1}. If these drops coalesce to form a big spherical drop, then terminal velocity of big drop is:

(1) 8 ms^{-1} (2) 16 ms^{-1}

(3) 24 ms^{-1} (4) 32 ms^{-1}

23. The water of 4×10^4 N/m^2 pressure moving with the velocity 2m/sec is flowing through a horizontal pipe of cross section 0.02 m^2. Its cross-section reduces and become 0.01 m^2. What is the pressure in the pipe of small cross-section ?

(1) 3.4×10^4 N/m^2 (2) 5×10^4 N/m^2

(3) 7.6×10^4 N/m^2 (4) None of these

24. A crystal has a coefficient of expansion 13×10^{-7}/°C in one direction and 231×10^{-7}/°C in every other direction at right angles to it. Then the cubical coefficient of expansion (in / °C) is :-

(1) 462×10^{-7} (2) 244×10^{-7}

(3) 218×10^{-7} (4) 475×10^{-7}

25. Two liquids A and B are at temperatures of 75°C and 15°C. Their masses are in the ratio of 2 : 3 and their specific heats in the ratio 3 : 4. What is the resulting temperature of their mixture?

(1) 90°C (2) 70°C

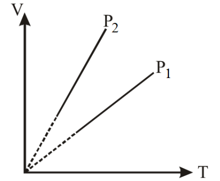
(3) 35°C (4) 60°C

26. The temperature of a perfect black body is the 727°C and its area is 0.1 m^2. If stefan's constant is 5.67×10^{-8} watt/m^2–K^4, then heat radiated by it in 1 minute is :

(1) 8100 cal (2) 81000 cal

(3) 810 cal (4) 81 cal

27. Figure shows the volume versus temperature graph for the same mass of a gas (assumed ideal) corresponding to two different pressures P_1 and P_2. Then,



(1) $P_1 > P_2$

(2) $P_1 < P_2$

(3) $P_1 = P_2$

(4) The information is insufficient

28. Internal energy of n_1 moles of hydrogen at temperature T is equal to the internal energy of n_2 mole of helium at temperature 2T. Then the ratio n_1/n_2 is :-

(1) $\frac{3}{5}$ (2) $\frac{2}{3}$ (3) $\frac{6}{5}$ (4) $\frac{3}{7}$

29. An ideal gas at one atmospheric pressure is adiabatically compressed so that its density becomes 32 times of its initial value. If the final pressure of gas is 128 atmospheres, the value of 'γ' of the gas is :-

(1) 1.5 (2) 1.6 (3) 1.3 (4) 1.4

30. The molecules of a given mass of a gas have root mean square speeds of 100 m s^{-1} at 27ºC and 1 atmospheric pressure. The root mean square speeds of the molecules of the gas at 127 ºC and 2 atmospheric pressure is :-

(1) $\frac{200}{\sqrt{3}}$ m/s (2) $\frac{100}{\sqrt{3}}$ m/s

(3) $\frac{400}{3}$ m/s (4) $\frac{200}{3}$ m/s

31. 10 mole of an ideal gas at constant temperature 500 K is compressed from 50 L to 5 L. Work done by gas in the process is :-
(given, R = 8.31 J -mol^{-1} K^{-1})

(1) -1.2×10^4 J

(2) -2.4×10^4 J

(3) -4.8×10^4 J

(4) -9.6×10^4 J

32. A linear harmonic oscillator of force constant 6×10^5 N/m and amplitude 4 cm, has a total energy 600 J. Select the correct statement.

(1) Maximum potential energy is 600 J

(2) Maximum kinetic energy is 480 J

(3) Minimum potential energy is 120 J

(4) All of these

33. If the length of simple pendulum is increased by 21%, then what % increase will be in time period of oscillating simple pendulum ?

(1) 11% (2) 21%

(3) 42% (4) 10%

34. The length of a sonometer wire is 1.25 m and density is 8×10^3 kg/m. It can bear a stress of 3.2×10^8 N/m^2 without exceeding the elastic limit. The fundamental frequency which can be produced in the wire, is :-

(1) 100 Hz (2) 80 Hz

(3) 200 Hz (4) 250 Hz

35. An open pipe is suddenly closed at one end with the result that the frequency of third harmonic of the closed pipe is found to be higher by 100 Hz than the fundamental frequency of the open pipe. The fundamental frequency of the open pipe is :-

(1) 200 Hz (2) 300 Hz

(3) 240 Hz (4) 480 Hz

SECTION - B (PHYSICS)

36. Two full turns of the circular scale of screw gauge cover a distance of 1 mm on its main scale. The total number of divisions on the circular scale is 50. Further, it is found that the screw gauge has a zero error of –0.03 mm. While measuring the diameter of a thin wire, a student notes the main scale reading of 3 mm and the number of circular scale divisions in line with the main scale as 35. The diameter of the wire is

(1) 3.38 mm (2) 3.32 mm

(3) 3.73 mm (4) 3.67 mm

37. If $\vec{A} = 2\hat{i} + \sqrt{7}\hat{j}$ and $\vec{B} = 5\hat{i} + \sqrt{7}\hat{j} - 3\hat{k}$, then the vector whose magnitude is equal to $\vec{A} \cdot \vec{B}$ and parallel to $\vec{B} - \vec{A}$ is :

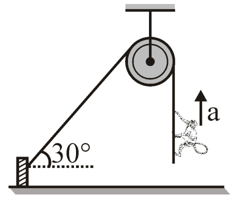
(1) $\frac{17}{\sqrt{2}}\left(\hat{k} - \hat{j}\right)$

(2) $\frac{17}{\sqrt{2}}\left(\hat{i} - \hat{k}\right)$

(3) $3\hat{i} - 3\hat{k}$

(4) $3\hat{k} - 3\hat{i}$

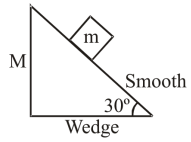
38. A light string fixed at one end to a clamp on ground passes over a fixed pulley and hangs at the other side. It makes an angle of 30° with the ground. A monkey of mass 5 kg climbs up the rope. The clamp can tolerate a vertical force of 40 N only. The maximum acceleration in upward direction with which the monkey can climb safely is (neglect friction and take g = 10 m/s^2) :



(1) 2 m/s^2 (2) 4 m/s^2

(3) 6 m/s^2 (4) 8 m/s^2

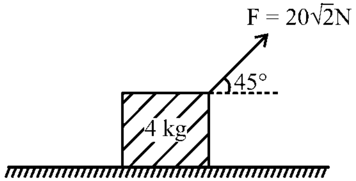
39. Required horizontal acceleration of the wedge so that block of mass m remains at rest w.r.t. wedge:-



(1) $10\sqrt{3}$ m/s^2 (2) $\frac{10}{\sqrt{3}}$ m/s^2

(3) $5\sqrt{3}$ m/s^2 (4) 10 m/s^2

40. A force F is applied on the block as shown in figure. If g = 10 m/s^2 then the acceleration of the block is :-



$\mu_s = 0.8$, $\mu_k = 0.6$

(1) 2 m/s^2 (2) 4 m/s^2 (3) 6 m/s^2 (4) Zero

41. A projectile is moving at 20m/s at its highest point, where it breaks into two equal parts due to an internal explosion. One part moves vertically up at 30 m/s with respect to ground. Then the other part will move with speed :-

(1) 20 m/s (2) $10\sqrt{13}$ m/s

(3) 50 m/s (4) 30 m/s

42. A body of mass 1 kg is moving in a vertical circular path of radius 1 m. The difference between the kinetic energies at its lowest and highest positions is :-

(1) 20 J (2) 10 J

(3) $4\sqrt{5}$ J (4) $10\left(\sqrt{5}-1\right)$ J

43. Suppose the gravitational force varies inversely as the nth power of the distance. Then, the time period of a planet in circular orbit of radius R around the sun will be proportional to :

(1) R^n (2) $R^{(n+1)/2}$

(3) $R^{(n-1)/2}$ (4) R^{-n}

44. Two bodies of masses m and 4m are placed at a distance r. The gravitational potential at a point on the line joining them where the gravitational field is zero is :-

(1) $-\frac{6Gm}{r}$ (2) $-\frac{9Gm}{r}$

(3) zero (4) $-\frac{4Gm}{r}$

45. 27 equal small water drops combine to form a big drop if surface tension of water is T and radius of small drop is r then :

(A) excess pressure inside big drop is three times of excess pressure inside small drop

(B) surface energy decreases in this process

(C) in this process 72 πr^2T energy releases

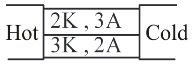
(D) radius of big drop is 3r

The true statement is :

(1) A, B, C (2) A, B, D

(3) B, C, D (4) B, D

46. Find equivalent thermal conductivity :–



(1) 6K/5 (2) 5K/2

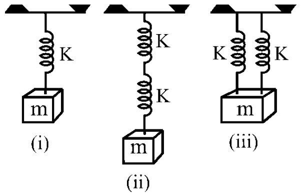
(3) 11K/5 (4) 12K/5

47. The internal energy of an ideal diatomic gas corresponding to volume V and pressure P is U = 2.5 PV. The gas expands from 1 litre to 2 litre at a constant pressure of one atmosphere. The heat supplied to gas is :-

(1) 100 J (2) 250 J

(3) 350 J (4) 50 J

48. Five identical springs are used in the following three configurations. The time periods of vertical oscillations in configurations (i), (ii) and (iii) are in the ratio:-



(1) $1:\sqrt{2}:\frac{1}{\sqrt{2}}$ (2) $2:\sqrt{2}:\frac{1}{\sqrt{2}}$

(3) $\frac{1}{\sqrt{2}}:2:1$ (4) $2:\frac{1}{\sqrt{2}}:1$

49. A closed orgn pipe of length L and an open organ pipe contain gases of densities ρ_1 and ρ_2 respectively. The compressibility of gases are equal in both the pipes. Both the pipes are vibrating in their first overtone with same frequency. The length of the open organ pipe is :-

(1) $\frac{L}{3}$ (2) $\frac{4L}{3}$

(3) $\frac{4L}{3}\sqrt{\frac{\rho_1}{\rho_2}}$ (4) $\frac{4L}{3}\sqrt{\frac{\rho_2}{\rho_1}}$

50. Length of a resonance tube is 130 cm. Speed of sound is 320 m/s and frequency of the source is 320 Hz.

	Column-I		Column-II
(a)	At resonance, minimum length of air column (in cm)	(i)	105
(b)	At resonance, minimum length of water column (in cm)	(ii)	3
(c)	At resonance, maximum length of water column (in cm)	(iii)	125
(d)	At resonance, maximum length of air column (in cm)	(iv)	25
(e)	Total number of resonance obtained is	(v)	5

Correct match between the columns is :

(1) a-(iv); b-(v); c-(i); d-(iii); e-(v)

(2) a-(iv); b-(i); c-(i); d-(iii); e-(ii)

(3) a-(iv); b-(v); c-(i); d-(iii); e-(ii)

(4) a-(iv); b-(iii); c-(i); d-(iv); e-(ii)

mistry, Equilibrium, Redox reactions, Chemical kinetics,
eriodic Table, Chemical Bonding, Molecular Structure, d &

SECTION - A (CHEMISTRY)

51. Phosphine (PH_3) is a poisonous gas which decompose to form molecular phosphorous (P_4) and hydrogen gas. If 200 mL of PH_3 is decomposed then the observed change in volume is : ($4PH_{3(g)} \longrightarrow P_{4(s)} + 6H_{2(g)}$).

(1) 100 mL increase in volume

(2) 100 mL decrease in volume

(3) 200 mL increase in volume

(4) 200 mL decrease in volume

52. If 30 mL of H_2 and 20 mL of O_2 react to form water, what is left at the end of the reaction ?

(1) 10 mL of H_2 (2) 5 mL of H_2

(3) 10 mL of O_2 (4) 5 mL of O_2

53. Match List I with List II.

	List I (Quantum Number)		**List II (Information provided)**
A.	m_ℓ	I.	shape of orbital
B.	m_s	II.	size of orbital
C.	ℓ	III.	orientation of orbital
D.	n	IV.	spin of electron

Choose the correct answer from the options given below :

(1) A-I, B-III, C-II, D-IV

(2) A-III, B-IV, C-I, D-II

(3) A-III, B-IV, C-II, D-I

(4) A-II, B-I, C-IV, D-III

54. The wave Number of first line in the Balmer series of hydrogen spectrum is :

(1) $\frac{5}{36}R$ (2) $\frac{3}{16}R$

(3) $\frac{1}{2}R$ (4) $\frac{21}{100}R$

55. A single electron orbits a stationary nucleus of charge +Ze, where Z is a constant. It requires 47.2 eV to excite electron from second Bohr orbit to third Bohr orbit, find the value of Z :-

(1) 1 (2) 3 (3) 5 (4) 4

56. In the reaction $2A(g) + B(g) \rightleftharpoons C(g) + 242$ kcal, which one of the following conditions will favour maximum formation of the product :

(1) Low temperature and high pressure

(2) Low temperature and low pressure

(3) High temperature and high pressure

(4) High temperature and low pressure

57. The equilibrium constant of the following reactions are given :

$3A \rightleftharpoons 3B\ ;\ K_1 = 10^{-3}$

$\frac{4}{3}B \rightleftharpoons \frac{4}{3}C\ ;\ K_2 = 10^{-4}$

$\frac{1}{5}D \rightleftharpoons \frac{1}{5}C\ ;\ K_3 = 10^{-1}$

The equilibrium constant of the reaction $D \rightleftharpoons A$ will be :

(1) 10^{-5} (2) 10^{-8}

(3) 10^{-1} (4) 10

58. What is the pH of the resultant solution when equal volumes of 0.1 M HCl and 0.01M NaOH are mixed

(1) 7 (2) 10

(3) 1.35 (4) 12.65

59. Calculate the pH of the solution in which 0.2 M pyridinum chloride and 0.1 M pyridine are present. The pK_b of pyridine is 8.75.

(1) 9.05 (2) 3.8

(3) 4.95 (4) 5.12

60. Find solubility of $Na_2SO_4(K_{sp} = 4 \times 10^{-15})$ in presence of 10^{-3}M $CaSO_4$ solution :-

(1) 10^{-12} M (2) 4×10^{-6} M

(3) 10^{-6} M (4) 4×10^{-12} M

61. Number of mole of MnO_4^- getting reduced to Mn^{2+} under acidic condition by 4.517×10^{24} electrons is :

(1) 7.5 moles (2) 2.5 moles

(3) 5.0 moles (4) 1.5 moles

62. Bromine undergoes disproportionation in basic medium according to reaction shown below:-

$aBr_2(g) + bOH^-(aq) \longrightarrow cBrO^-(aq) + dBr^-(aq) + eH_2O(\ell)$

The value of a, b, d, e in the balanced redox reaction are respectively :-

(1) 2, 4, 2 and 1 (2) 1, 4, 2 and 2

(3) 2, 1, 4 and 2 (4) 2, 4, 2 and 2

63. Which of the following has non zero standard enthalpy of formation :

(1) $Hg(\ell)$ (2) $Cl_2(g)$

(3) H(g) (4) Ne(g)

64. If the bond energies of H–H, Br–Br and H–Br are 433, 192 and 364 kJ mol^{-1} respectively, ΔH° for the reaction, $H_{2(g)} + Br_{2(g)} \rightarrow 2HBr_{(g)}$ is

(1) –261 kJ (2) +103 kJ

(3) +261 kJ (4) –103 kJ

65. The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmosphere to 10 atmosphere is : (Given R = 2.0 cal K^{-1} mol^{-1})

(1) 0 calorie (2) –413.14 calories

(3) 413.14 calories (4) 100 calories

66. **Statement-I:** The greater the disorder in an isolated system, higher is the entropy.

Statement-II: Decrease of regularity in structure would mean increase in entropy.

(1) Statement-I is correct but statement-II is incorrect.

(2) Statement-I is incorrect but statement-II is correct.

(3) Both Statement-I and statement-II are incorrect.

(4) Both Statement-I and statement-II are correct.

67. For a certain thermochemical reaction, P ⟶ Q at T = 300 K the value of ΔH° = 50 kJ mol^{-1} and ΔS° = 20 JK^{-1} then the value of equilibrium constant for the reaction will be :-

(1) 2.4×10^2 (2) 2.2×10^{-8}

(3) 4.6×10^{-6} (4) 1.6×10^8

68. For a 1st order reaction, slope of lnk vs $\frac{1}{T}$ graph is –4000 then activation energy in kcal/mol is :

(1) 8000 (2) 8

(3) 33.2 (4) 800

69. Given below are two statements

Statement-I : Number of reacting species taking part in an elementary reaction which must collide simultaneously in order to bring about a chemical reaction is called molecularity of a reaction.

Statement-II : Order of reaction is applicable to elementary reaction only, and for complex reaction order has no meaning.

In light of above statements, choose the correct answer from the options given below :

(1) Both statement I and statement II are true.

(2) Both statement I and statement II are false.

(3) Statement I is true but statement II is false.

(4) Statement I is false but statement II is true.

70. The Van't Hoff factor for a 0.1 M $Al_2(SO_4)_3$ solution is 4.2 the degree of dissociation is :-

(1) 80% (2) 90% (3) 78% (4) 83%

71. The standard cell potential of the following cell

$Zn|Zn^{2+}(aq)||\ Fe^{2+}(aq)|Fe$

is 0.32 V. Calculate the standard Gibbs energy change for the reaction :

$Zn(s) + Fe^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Fe(s)$

(Given : 1 F = 96487C)

(1) –61.75 kJ mol^{-1} (2) +5.006 kJ mol^{-1}

(3) –5.006 kJ mol^{-1} (4) +61.75 kJ mol^{-1}

72. The resistance of a 1N solution of salt is 50 Ω. Calculate the equivalent conductance of the solution, if the two platinum electrodes in solution are 2.1 cm apart and each having an area of 4.2 cm^2.

(1) 10 ohm^{-1} cm^2 eq^{-1}

(2) 0.1 ohm^{-1} cm^2 eq^{-1}

(3) 10 ohm^{-1} m^2 eq^{-1}

(4) 0.3 ohm^{-1} m^2 eq^{-1}

73. From the following select the one which is **not** an example of corrosion.

(1) Rusting of iron object

(2) Production of hydrogen by electrolysis of water

(3) Tarnishing of silver

(4) Development of green coating on copper and bronze ornaments

74. For the titration between $KMnO_4$ and $H_2C_2O_4$ in acidic medium, the acid used is :-

(1) dilute H_2SO_4 (2) dilute HCl

(3) concentrate HNO_3 (4) dilute H_2SO_3

75. **Statement I :** Enthalpy of neutralization of strong acid and strong base is constant.

Statement II : Neutralization is an exothermic reaction.

(1) Both **Statement I** and **Statement II** are incorrect.

(2) **Statement I** is correct but **Statement II** is incorrect.

(3) **Statement I** is incorrect but **Statement II** is correct.

(4) Both **Statement I** and **Statement II** are correct.

76. **Assertion (A) :-** CH_2Cl_2 is a non-polar molecule while CCl_4 is a polar molecule.

Reason (R) :- Molecule with zero dipole moment are non-polar in nature.

(1) Both A and R are true and R is the correct explaination of A

(2) Both A and R are true but R is not correct explaination of A

(3) A is false, R is true

(4) A is true, but R is false

77. Identify the **incorrect** statement-

(1) PEt_3 and $AsPh_3$ as ligands can form $d\pi$-$d\pi$ bond with transition metals

(2) The N-N single bond is as strong as the P-P single bond.

(3) Nitrogen has unique ability to form $p\pi$-$p\pi$ multiple bonds with nitrogen, carbon and oxygen

(4) Nitrogen cannot form $d\pi$-$p\pi$ bond as other heavier elements of its group.

78. Identify the **correct** answer.

(1) Three resonance structures can be drawn for ozone

(2) BF_3 has non-zero dipole moment

(3) Dipole moment of NF_3 is greater than that of NH_3

(4) Three canonical forms can be drawn for CO_3^{2-} ion.

79. Match **List-I** with **List-II**

	List-I (Block/group in periodic table)		**List-II (Element)**
(A)	Lanthanoid	I.	Ce
(B)	d-block element	II.	As
(C)	p-block element	III.	Cs
(D)	s-block element	IV.	Mn

Choose the **correct** answer from the options given below :

(1) A-I, B-II, C-IV, D-III

(2) A-I, B-IV, C-III, D-II

(3) A-I, B-IV, C-II, D-III

(4) A-IV, B-I, C-II, D-III

80. The pair of lanthanoid ions which are diamagnetic is

(1) Ce^{4+} and Yb^{2+} (2) Ce^{3+} and Eu^{2+}

(3) Gd^{3+} and Eu^{3+} (4) Pm^{3+} and Sm^{3+}

81. The E° value for the Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} due to change of

(1) d^5 to d^4 configuration

(2) d^5 to d^2 configuration

(3) d^4 to d^5 configuration

(4) d^3 to d^5 configuration

82. The bonds present in the structure of dichromate ion are :

(1) Four equivalent Cr – O bonds only

(2) Six equivalent Cr – O bonds and one Cr – Cr bond

(3) Eight equivalent Cr – O bonds

(4) Six equivalent Cr – O bonds and one Cr – O – Cr bond

83. Identify the **incorrect** statement :

(1) Na_2O is a basic oxide and Cl_2O_7 is an acidic oxide.

(2) The following four species are called isoelectronic species : O^{2-}, F^-, Na^+ and Mg^{2+}.

(3) Among the four species Mg, Al, Mg^{2+} and Al^{3+}, the smallest one is Al.

(4) The oxidation and coordination number (or covalency) of Al in $[AlCl(H_2O)_5]^{2+}$ are +3 and 6, respectively

84. Arrange the following elements in increasing order of electronegativity.
N, O, F, C, Si
Choose the correct answer from the options given below :

(1) $Si < C < N < O < F$

(2) $Si < C < O < N < F$

(3) $O < F < N < C < Si$

(4) $F < O < N < C < Si$

85. **Statement-I :** According to modern periodic law, " the physical and chemical properties of elements are periodic functions of their atomic mass."
Statement-II : In long form of periodic table the horizontal rows (which Mendeleev called series) are called periods and the vertical coloums group

(1) Both statement I and statement II are true.

(2) Both statement I and statement II are false.

(3) Statement I is true but statement II is false.

(4) Statement I is false but statement II is true.

SECTION - B (CHEMISTRY)

86. A compound contains 4.07% H, 24.27% C & 71.65% Cl. Find it's empirical formula :-

(1) $CHCl$ (2) CH_2Cl

(3) CH_2Cl_2 (4) $C_2H_2Cl_2$

87. The quantum numbers of four electrons are given below :

I. $n = 4,\ \ell = 2,\ m_\ell = -2,\ s = -\frac{1}{2}$

II. $n = 3,\ \ell = 2,\ m_\ell = 1,\ s = +\frac{1}{2}$

III. $n = 4,\ \ell = 1,\ m_\ell = 0,\ s = +\frac{1}{2}$

IV. $n = 3,\ \ell = 1,\ m_\ell = -1,\ s = +\frac{1}{2}$

The **correct** decreasing order of energy of these electrons is :

(1) IV > II > III > I

(2) I > III > II > IV

(3) III > I > II > IV

(4) I > II > III > IV

88. At 1000 K, value of K_P for the reaction $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ is 100 then at same temperature, value of K_C will be ?
(Given : R = 0.083 L bar K^{-1} mol^{-1})

(1) 8.3 (2) 8.3×10^{-3}

(3) 8.3×10^5 (4) 8.3×10^3

89. Match column I with column II :

Column-I		**Column-II (Ksp)**	
(P)	$Li_3Na_3(A\ell F_6)_2$	(I)	$4s^3$
(Q)	Hg_2I_2	(II)	$27s^4$
(R)	AgBr	(III)	$2916s^8$
(S)	$A\ell(OH)_3$	(IV)	s^2

(1) P→(IV), Q→(III), R→(I), S→(II)

(2) P→(IV), Q→(I), R→(II), S→(III)

(3) P→(III), Q→(I), R→(IV), S→(II)

(4) P→(I), Q→(III), R→(IV), S→(II)

90. Which of the following is an example of non-metal displacement reaction?

(1) $Zn(s) + CuSO_4(aq) \longrightarrow Cu(s) + ZnSO_4(aq)$

(2) $5Ca(s) + V_2O_5(s) \longrightarrow 2V(s) + 5CaO(s)$

(3) $2Mg(s) + TiCl_4(\ell) \longrightarrow Ti(s) + 2MgCl_2(s)$

(4) $2Na(s) + 2H_2O(\ell) \longrightarrow 2NaOH\ (aq) + H_2(g)$

91. $N_2(g) + 2O_{2(g)} \longrightarrow 2NO_2$; $\Delta H = x$ kJ
$2NO(g) + O_{2(g)} \longrightarrow 2NO_2(g)$; $\Delta H = y$ kJ
The enthalpy of formation of NO is -

(1) (2x – 2y) kJ/mol

(2) (x – y) kJ/mol

(3) $\frac{1}{2}$ (y – x) kJ/mol

(4) $\frac{1}{2}$ (x – y) kJ/mol

92. For a zero order reaction R ⟶ P, initial concentration of R is 1 M and after 60 seconds, concentration of R becomes 0.6 M then rate constant of reaction is :-

(1) 0.6 M min^{-1}

(2) 0.4 M min^{-1}

(3) 6.6×10^{-3} M min^{-1}

(4) 0.01 M min^{-1}

93. At temperature T kelvin value of Henry's constant for gases P, Q, R, S are given below respectively 1.1×10^{-3}, 5.3×10^{-1}, 6.83×10^{-4}, 8×10^{-2}. Then increasing order of solubility of gases P, Q, R, S in same liquid is :-

(1) $S < R < P < Q$

(2) $Q < P < R < S$

(3) $P < Q < S < R$

(4) $Q < S < P < R$

94. The plot of osmotic pressure (Π) vs concentration (mol L^{-1}) for a solution gives a straight line with slope 25.73 L bar mol^{-1}. The temperature at which the osmotic pressure measurement is done is: (Use R = 0.083 L bar mol^{-1} K^{-1})

(1) 37°C (2) 310°C

(3) 25.73°C (4) 12.05°C

95. How much calcium will be obtained by passing 2 ampere current for 9650 seconds through molten $CaCl_2$? [atomic weight of Ca = 40, IF = 96500 C)

(1) 0.1 g (2) 4.0 g

(3) 0.2 g (4) 40 g

96. Match List-I with List-II :

	List-I (Molecule)		**List-II Bond enthalpy ($kJ\ mol^{-1}$)**
A.	HCl	I.	435.8
B.	N_2	II.	498
C.	H_2	III.	946.0
D.	O_2	IV.	431.0

Choose the **correct** answer from the options given below :

(1) A-III, B-IV, C-I, D-II

(2) A-IV, B-I, C-III, D-II

(3) A-IV, B-III, C-II, D-I

(4) A-IV, B-III, C-I, D-II

97. Identify the **incorrect** statement about PCl_5.

(1) PCl_5 possesses two axial P–Cl bonds.

(2) All five P–Cl bonds are identical in length.

(3) PCl_5 exhibits sp^3d hybridisation in vapour phase.

(4) PCl_5 consists of five P–Cl (sigma) bonds.

98. The UV-visible absorption bands in the spectra of lanthanoid ions are 'X', probably because of the excitation of electrons involving 'Y'. The 'X' and 'Y', respectively, are :

(1) Broad and f orbitals

(2) Narrow and f orbitals

(3) Broad and d and f orbitals

(4) Narrow and d and f orbitals

99. Arrange the following elements in increasing order of first ionization enthalpy :
Li, Be, B, C, N
Choose the correct answer from the options given below :

(1) $Li < Be < B < C < N$

(2) $Li < B < Be < C < N$

(3) $Li < Be < C < B < N$

(4) $Li < Be < N < B < C$

100. **Statement-I :** Neptunium and Plutonium like Actinium and Protactinium are found in pitche blend i.e., an ore of uranium.
Statement-II : A plot of $\sqrt{v}$ against atomic mass gave a straight line (where v is frequency of x-rays emitted).

(1) Both statement I and statement II are true.

(2) Both statement I and statement II are false.

(3) Statement I is true but statement II is false.

(4) Statement I is false but statement II is true.

Plants, Genetics : Principles Of Inheritance And Variation,
World :The Living World, Biological Classification, Plant
nt, Biomolecule with Enzyme

SECTION - A (BOTANY)

101. Most abundant protein in animals is :-

(1) Collagen (2) Myosin

(3) Actin (4) Albumin

102. All the following statements about the structure of glycogen are true, **except** that-

(1) It is a branched polypeptide.

(2) It is a polymer of glucose.

(3) It's right end is called the reducing end.

(4) It's left end is called the non-reducing end.

103. Two cytokinins are kinetin and zeatin. What is the difference between the two ?

(1) Kinetin is the active form of zeatin

(2) Zeatin is the active form of kinetin

(3) Zeatin is a synthetic cytokinin and kinetin is naturally occurring

(4) Zeatin is a naturally occurring cytokinin while kinetin is not

104. Which of the following plant hormones was first isolated from human urine ?

(1) Auxin

(2) Cytokinin

(3) Ethylene

(4) Gibberellic acid

105. Fruit and leaf drop at early stages can be prevented by the application of :-

(1) Ethylene

(2) Auxin

(3) Gibberellic acid

(4) Cytokinin

106. **Statement-I :** Growth is regarded as one of the fundamental and conspicuous characteristics of a living being.
Statement-II : Growth can be defined as an irreversible permanent increase in size of an organ or its part or even of an individual cell.

(1) Statement-I & Statement-II both are correct.

(2) Statement-I is correct & Statement-II is incorrect.

(3) Statement-I is incorrect & Statement-II is correct.

(4) Statement-I & Statement-II both are incorrect.

107. Which one is a primary metabolite ?

(1) Rubber (2) ATP

(3) Diterpenes (4) Gums

108. Consider the following four statements **(a-d)** and select the option which includes all the **correct** ones only :-
(a) Zinc is a cofactor for the proteolytic enzyme carboxypeptidase
(b) Nicotinamide adenine dinucleotide contain the vitamin riboflavin
(c) Haem act as prosthetic group of the enzyme that catalyzes the breakdown of hydrogen peroxide to water and oxygen
(d) Cofactor is the part of enzyme which does not affect the catalytic activity of the enzyme
Options :-

(1) Statements (b), (c) and (d)

(2) Statements (a) and (b)

(3) Statements (a) and (c)

(4) Statements (a), (c) and (d)

109. Which hormone promotes female flowers in cucumber ?

(1) ABA (2) C_2H_4 (3) GA_4 (4) IAA

110. *Parthenium* was introduced in India as contaminant with.

(1) Rice (2) Mango

(3) Wheat (4) Sugarcane

111. Which of the following statements is correct ?

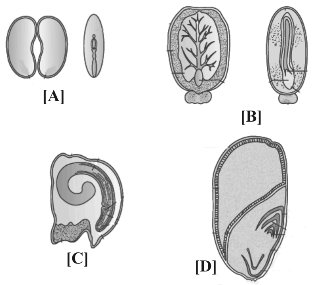
(1) The body of ovule fuses with funicle in the region called chalaza

(2) Polar nuclei are situated in the central cell above the egg apparatus.

(3) Cleistogamous flowers are invariably autogamous

(4) Pollen tube releases the two male gametes into the cytoplasm of egg cell

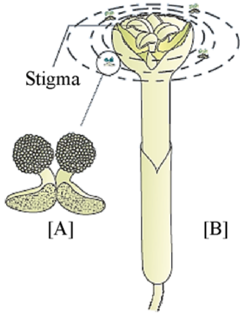
112. Which one of the following diagrams represents endospermic dicot seed?



(1) A only (2) B only

(3) C, D both (4) A, B both

113. Following diagrams (A) & (B) represent?



(1) (A) Female flower of *Hydrilla*
(B) Male flower of *Hydrilla*

(2) (A) Male flower of *Hydrilla*
(B) Female flower of *Hydrilla*

(3) (A) Female flower of *Vallisneria*
(B) Male flower of *Vallisneria*

(4) (A) Male flower of *Vallisneria*
(B) Female flower of *Vallisneria*

114. In castor, both male and female flowers are present on the same plant, then plant is said to be monoecious. This condition prevents :

(1) Both autogamy and geitonogamy

(2) Geitonogamy only

(3) Autogamy only

(4) Rarely autogamy and rarely geitonogamy

115. Which of the following is not a water pollinated plant ?

(1) *Zostera*

(2) *Vallisneria*

(3) *Hydrilla*

(4) Water lily

116. Read the following statements. Choose the correct statements from the following option :-

(I) In angiosperm pollen grain is the final product of sexual reproduction.

(II) The wall of the ovary develop into the wall of fruit called perisperm.

(III) Banana is example of false fruit.

(IV) Endosperm is part of seed not embryo.

Option :-

(1) All are correct

(2) All are incorrect

(3) Only (IV) is correct

(4) Only (III) and (IV) are correct

117. In cleistogamous flowers :-

(1) Autogamy and xenogamy can occurs naturally

(2) Geitonogamy and autogamy can occurs naturally

(3) Only autogamy occurs naturally

(4) Only xenogamy occurs naturally

118. Which one of the following options gives the correct categorisation of six plants according to the type of seeds (A, B, C) they have ?

	A Endospermic seeds (Albuminous seeds)	**B Non-endospermic seeds (Non-albuminous seeds)**	**C Perispermic seeds**
(1)	Maize, wheat	Pea, groundnut	Black pepper, beet
(2)	Maize, wheat	Black pepper, beet	Pea, groundnut
(3)	Black pepper, beet	Maize, wheat	Pea, groundnut
(4)	Pea, groundnut	Maize, wheat	Black pepper, beet

119. How many pairs of contrastring characters in pea plant were studies by mendel in his experiment:-

(1) Six (2) Eight

(3) Fourteen (4) Seven

120. Which of the following is 'X' linked recessive disease ?

(A) Colour blindness

(B) Sickle cell anaemia

(C) Albinism

(D) Haemophilia

(1) A, D (2) A, B, C, D

(3) B, C, D (4) A, B, C

121. Gene of colourblindness is not transferred from :

(1) Colourblind mother to son

(2) Colourblind father to daughter

(3) Colourblind mother to son and daughter

(4) Colourblind father to son

122. The law of segregation of character is also called the law of purity of gamets because-

(1) Gamets have only one of the two alleles for each character

(2) Gamets can be contrasting

(3) Both 1 and 2

(4) Gamets are very different type of cells

123. Double-helical structure of DNA was solved using which of the following experimental technique ?

(1) Centrifugation

(2) Chromatography

(3) X-ray crystallography

(4) Microscopy

124. Choose the incorrect statement :-

(1) DNA act as genetic material.

(2) RNA act as genetic material.

(3) RNA act as genetic material when DNA is not present.

(4) RNA may act as genetic material even when DNA is present.

125. Which is incorrect for genetic code–

(i) The codon is triplet

(ii) 64 codons code for amino acids

(iii) Genetic code is unambiguous

(iv) Genetic code is nearly universal

(v) AUG has dual functions

(1) only ii

(2) ii & iii

(3) iii, iv & v

(4) All are correct

126. Match the column :-

Column-I		Column-II	
(A)	Termination	(i)	One codon codes for only one amino acid
(B)	Non-ambiguity	(ii)	One amino acid is coded by more than one codon
(C)	Universality	(iii)	Ochre, Amber, Opal
(D)	Degeneracy or redundancy	(iv)	From bacteria to human beings UUU codes for phenyl alanine

(1) A = (iii), B = (ii), C = (iv), D = (i)

(2) A = (iii), B = (i), C = (iv), D = (ii)

(3) A = (iv), B = (i), C = (ii), D = (iii)

(4) A = (iii), B = (iv), C = (i), D = (ii)

127. Match the column-I with column-II

	Column-I		Column-II
A	Hershey and Chase	i	Nuclein
B	Watson and Crick	ii	Double helix model of DNA
C	F. Meischer	iii	X-Ray diffraction
D	Wilkins and Franklin	iv	Proved that DNA is genetic material

(1) A-ii, B-i, C-iii, D-iv

(2) A-iv, B-i, C-ii, D-iii

(3) A-iv, B-ii, C-iii, D-i

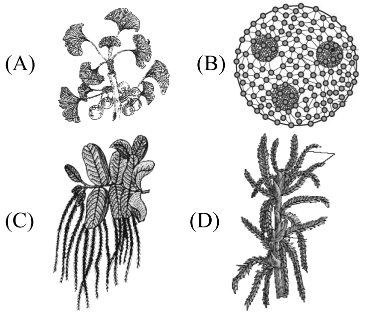
(4) A-iv, B-ii, C-i, D-iii

128. Consider the following four statements (a-d) and select the option which include all the correct ones only :-
(a) Unlike bryophytes and pteridophytes, in gymnosperms the male and female gametophyte do not have an independent free living existence.
(b) In some pteridophytes, the female gametophyte is retained on the parent sporophyte for variable period.
(c) Algae are paramount importance as primary producers of energy-rich compounds.
(d) Bryophytes do not play any role in plant succesion occuring on bare rock or soil or terrestrial habitat.

(1) b, c and d (2) a, c and d

(3) a, b and d (4) a, b and c

129. Identify the following figures labelled as A, B, C and D.



	A	B	C	D
(1)	*Pinus*	*Chlamydomonas*	*Salvinia*	*Funaria*
(2)	*Ginkgo*	*Fucus*	*Equisetum*	*Sphagnum*
(3)	*Ginkgo*	*Volvox*	*Salvinia*	*Sphagnum*
(4)	*Cycas*	*Volvox*	*Sphagnum*	*Selaginella*

130. Which of the following is correctly matched ?

(1) Chlorophyceae : chlorophyll-a + chlorophyll-b + pecto cellulosic cell wall

(2) Pheophyceae : chlorophyll-a + chlorophyll-c + carrageen in cell wall

(3) Rhodophyceae : chlorophyll-a + chlorophyll-c + $CaCO_3$ cell wall

(4) (1) & (3) both

131. Which of the following is an example of heterosporous pteridophyta :

(1) *Adiantum* (2) *Equisetum*

(3) *Pteris* (4) *Selaginella*

132. Which one is not a xerophytic adaptation of gymnosperm ?

(1) Needle like Leaves.

(2) Symbiotic association with N_2 fixing organisms.

(3) Sunken stomata

(4) Thick cuticle.

133. Which of the following organisms are smallest, completely lack cell wall, pathogenic in animals and plants and can survive without oxygen ?

(1) Archaebacteria (2) Eubacteria

(3) Cyanobacteria (4) *Mycoplasma*

134. Mad cow disease in catttle is caused by an organism which has :-

(1) Inert crystalline structure

(2) Abnormally folded protein

(3) Free RNA without protein coat

(4) Free DNA without protein coat

135. Which organism are responsible for red appearance of sea by their rapid multiplication?

(1) *Euglena*

(2) *Noctiluca*

(3) *Gonyaulax*

(4) *Trypanosoma*

SECTION - B (BOTANY)

136. Which one is **correct** ?

(1) $E + S \longrightarrow ES \longrightarrow E + P \longrightarrow EP$

(2) $E + S \longrightarrow EP \longrightarrow ES \longrightarrow E + P$

(3) $E + S \rightleftharpoons ES \rightleftharpoons E \rightleftharpoons P \rightleftharpoons E + P$

(4) $E + S \rightleftharpoons ES \longrightarrow EP \longrightarrow E + P$

137. **Assertion:** Biocatalyst are differ from inorganic catalysts.
Reason: Unlike inorganic catalysts, biocatalysts damaged at high temperature.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

138. Consider the following four statements **(a-d)** and select the option which includes all the **incorrect** ones only :-
(a) PGR, which is used to speed up the malting process, also promotes internode elongation just prior to flowering in cabbage
(b) PGR, which is called stress hormone, acts as an general plant growth inhibitor.
(c) In most higher plants, the growing apical bud inhibits the growth of the axillary bud. This phenomenon is called decapitation.
(d) PGR ethylene could fit either of the groups (promoter or inhibitor), but it is largely a promoter of growth activities
Options :-

(1) Statements (b), (c) and (d)

(2) Statements (a), (b)

(3) Statements (c), (d)

(4) Statements (a), (c) and (d)

139. Match column-I with column-II and select the correct option from the codes given below :-

	Column-I		Column-II
A	F.W. went	i	Cytokinin
B	Miller and Skoog	ii	GA
C	H. H. Cousins	iii	Ethylene
D	Kurosawa	iv	Auxin

Options : -

(1) A-(iv), B-(i), C-(iii), D-(ii)

(2) A-(iv), B-(i), C-(ii), D-(iii)

(3) A-(iii), B-(i), C-(ii), D-(iv)

(4) A-(iii), B-(iv), C-(ii), D-(i)

140. Read the following four statements (A–D)

(A) Inner wall of pollen grain is pecto-cellulosic in nature

(B) In pollen grain generative cell is bigger and contains abundant food reserve.

(C) In angiosperms pollen grain are shed always at 2-celled stage.

(D) Sporogenous cell directly behaves as the megaspore mother cell

How many of the above statements are wrong?

(1) Four (2) One (3) Two (4) Three

141.

(a) *Michelia*	(i) One ovule in each ovary
(b) *Papaver*	(ii) Many ovule in each ovary
(c) Papaya	(iii) Monocarpellary
(d) Paddy	(iv) Multicarpellary syncarpous
	(v) Multicarpellary, Apocarpous

Choose the correct match :

(1) a-i, b-ii, c-iii, d-iv (2) a-v, b-iii, c-ii, d-i

(3) a-v, b-iv, c-ii, d-i (4) a-iv, b-v, c-i, d-ii

142. Match a, b, c and d with i, ii, iii and iv:

(a)	Pollen tablets	(i)	Pollen viability for months
(b)	Rosaceae	(ii)	Pollen Allergy
(c)	Pollen bank	(iii)	Food supplement
(d)	*Parthenium*	(iv)	–196°C

Choose the correct match :

(1) a-i, b-iii, c-ii, d-iv (2) a-iii, b-iv, c-i, d-ii

(3) a-iii, b-i, c-iv, d-ii (4) a-ii, b-i, c-iv, d-iii

143. A colour blind man X^CY has a colour blind sister (X^CX^C) and a normal brother XY. What is the genotype of mother and father?

(1) X^CX^C, X^CY (2) XX^C, X^CY

(3) X^CX^C, XY (4) XX^C, XY

144. Henking observed that in few insects (Grass hopper) male, 50% of the sperm received a specific nuclear structure known as X - body, whereas other 50% sperms did not receive it. This method of sex determination is :-

(1) XX - XY method (2) XX - XO method

(3) ZZ - ZW method (4) Haplodiploidy

145. **Assertion (A) :-** In DNA fingerprinting, after hybridization with VNTR probe, the autoradiogram gives many bands of different sizes.

Reason (R) :- It differs from individual to individual in a population except dizygotic twins.

(1) Both A and R are true and the R is a correct explanation of the A

(2) Both A and R are true but R is not a correct explanation of the A

(3) A is true but the R is false

(4) Both A and R are false

146. The process of copying genetic information from one strand of DNA into ....(Y)..... is termed as .....(Z)...... :-

	Y	Z
(1)	Transcription	RNA
(2)	RNA	Transcription
(3)	DNA	Replication
(4)	Replication	DNA

147. Arrange the following events of life cycle of bryophytes in correct sequence :-

I. Germination of spore
II. Gametes formation
III. Formation of gametophyte
IV. Fertilization
V. Embryo formation

(1) I,III,IV,V,II (2) II,IV,I,V,III

(3) I,III,II,IV,V (4) V,I,II,III,IV

148. Match the column-I with column-II and choose the right option :-

Column-I		Column-II	
A.	Ascomycetes	(i)	*imperfect fungi*
B.	Deuteromycetes	(ii)	*Plasmodium*
C.	Slime moulds	(iii)	*Sac fungi*
D.	Desmids	(iv)	*Golden algae*

(1) A-i, B-ii, C-iii, D-iv

(2) A-ii, B-i, C-iv, D-iii

(3) A-iii, B-i, C-ii, D-iv

(4) A-iv, B-iii, C-i, D-ii

149. Consider the following four statements (A-D) and select the option which includes all the correct ones only.

(A) Archaebacteria differ from other bacteria in having a different cell wall structure

(B) Bacteria as a group show the most extensive metabolic diversity

(C) All Eubacteria have chlorophyll 'a' pigment similar to green plants.

(D) The RNA of the viroid has of low molecular weight.

(1) Statements B, C & D

(2) Statements A, C only

(3) Statements B, D only

(4) Statements A, B & D

150. Which pair of characters is defining feature of living organisms :-

(1) Growth and reproduction

(2) Consciousness and reproduction

(3) Metabolism and growth

(4) Consciousness and metabolism

chnology : Principles And Processes, Biotechnology And Its
Animal Kingdom, Evolution :Origin And Evolution, Human
atory System), Body Fluids And Circulation (Circulatory

SECTION - A (ZOOLOGY)

151. Triploblastic, pseudosegmeted, acoelomate exhibiting bilateral symmetry and reproducing both asexually and sexually with parasitic forms." The above description is characteristic of phylum

(1) Platyhelminthes (2) Annelida

(3) Ctenophora (4) Cnidaria

152. Find out odd one :

(1) *Unio* (2) Star fish

(3) *Balanoglossus* (4) Fish

153. Birds and mammals share one of the following characteristics as a common feature :

(1) Pneumatic bones (2) Viviparity

(3) Warm blooded (4) Body hair

154. Read the following statements carefully and answer the question given below.

(a) Cyclostomates have circular and sucking mouth without jaw.

(b) Chondrichthyes have a gill slits without operculumn.

(c) Osteichthyes have 5-7 pairs of gills covered by operculum.

(d) In Amphibia alimentary canal, urinary & reproductive track open in anus.

How many of the above statements is/are incorrect.

(1) (b) & (c) (2) (c) & (d)

(3) Only (d) (4) (b) & (d)

155. Man who, probably ate meat and with 900 cc cranial capacity is

(1) *Homo habilis* (2) Homo sapiense

(3) *Homo erectus* (4) Neanderthal man

156. Which of the following factors do not affect the genetic equilibrium ?

(1) Mutation

(2) Gene flow

(3) Random mating

(4) Genetic drift

157. According to Oparin and Haldane theory, 1st form of life could have come from :-

(1) Pangene

(2) Pre-existing living organic molecules

(3) Pre-existing non-living organic molecules

(4) Pre-existing life

158. Which of the following is a mismatched with respect of given animal and its characterstics ?

(1) Pteranodon - Flying dinosaur

(2) Archaeopteryx - Connecting link between reptiles and birds.

(3) Stegosaurus- Biggest dinosaur

(4) Crocodilian - Living reptile

159. **Assertion :-** The anatomically different structure of wings of butterfly and birds perform same function.

Reason :- Different structure are evolved for the same function and hence having similarity a result of convergent evolution.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

160. Inspiration occur if :-

(1) Intrapulmonary pressure is more than atmospheric pressure

(2) Intrapulmonary pressure is less than atmospheric pressure

(3) Intrapulmonary pressure is equal to atmospheric pressure

(4) Intrapulmonary pressure is less than cellular pressure

161. Total volume of air accomodate in the lungs at the end of forced inspiration :-

(1) TV + IRV

(2) TV + IRV + ERV

(3) TV + ERV

(4) TV + IRV + ERV + RV

162. Trachea divides at the level of which vertebra:

(1) 6th thoracic vertebra

(2) 5th thoracic vertebra

(3) 5th lumbar vertebra

(4) 6th lumbar vertebra

163. Find out the correct match from the following :-

(i) **Larynx** – sound box
(ii) **Trachea** – complete cartilagenous rigns
(iii) **Epiglottis** – elastic cartilagenous flap
(iv) **Alveoli** – very thin, irregular walled, vascularised bag like structures
(v) **Pleural fluid** – reduces friction on the lung surface

(1) (i), (ii), (iii), (iv), (v) (2) (i), (iii), (iv), (v)

(3) (i), (iii), (v) (4) (i) and (v)

164. In which pair erythroblastosis foetalis can occur :–

(1) Rh^+ male & Rh^- female

(2) Rh^- male & Rh^- female

(3) Rh^+ male & Rh^+ female

(4) Rh^- male & Rh^+ female

165. During ventricular systole :-

(1) Semilunar valves are closed

(2) About 30 percent blood is pumped into aorta from ventricles.

(3) Tricuspid and Bicuspid valves are closed

(4) Ventricular pressure declines

166. ***Assertion (A) :*** DUP is of shorter duration and sharp sound.
Reason (R) : It is created by the opening of semilunar valves.

(1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(2) (A) is correct but (R) is not correct

(3) (A) is incorrect but (R) is correct

(4) Both (A) and (R) are correct but (R) is the correct explanation of (A)

167. Read the following statements & choose correct option.

Statement-I : Atria receive blood from all parts of body which subsequently flows to ventricles.

Statement-II : Action potential generated at SA node passes from atria to ventricles.

(1) Statement-I incorrect, Statement-II correct

(2) Statement-I correct, Statement-II incorrect

(3) Statement-I correct, Statement-II correct

(4) Statement-I incorrect, Statement-II incorrect

168. Atheroscterosis is called.

(1) Coronary artery disease

(2) Angina

(3) Heart failure

(4) Hypertension

169. Match the following columns :-

Column-I		**Column-II**	
A.	Ladybird beetle	(i)	Nitrogen fixation
B.	Mycorrhiza	(ii)	Bio gas
C.	Methanogens	(iii)	Aphids
D.	Rhizobium	(iv)	Glomus

	A	**B**	**C**	**D**
(1)	(ii)	(iv)	(iii)	(i)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(iii)	(ii)	(i)	(iv)

170. Pick up the wrong statement :-

(1) Antibiotics are chemical substances, which are produced by some microbes.

(2) Antibiotics can kill or retard the growth of microbes.

(3) Penicillin was first antibiotic to be discovered.

(4) Penicillin was discovered by Chain and florey only.

171. Match the column -

Column-I		**Column-II**	
(a)	Gel electrophoresis	(i)	Bright orange coloured
(b)	PCR	(ii)	Chilled ethanol
(c)	DNA precipitation	(iii)	Sieving effect
(d)	Ethidium bromide stained DNA	(iv)	DNA primer

(1) a - i; b - ii, c - iii, d - iv

(2) a - ii; b - iii, c - iv, d - i

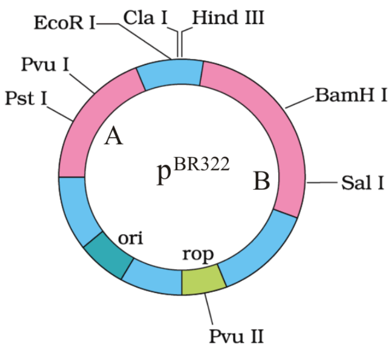
(3) a - iii; b - iv, c - i, d - ii

(4) a - iii; b - iv, c - ii, d - i

172. **Statement-I :** Micro injection technique is mainly used for animal cells.
Statement-II : Biolistic method is suitable for plants.
(1) Both **Statement I** and **Statement II** are incorrect.
(2) **Statement I** is correct but **Statement II** is incorrect.
(3) **Statement I** is incorrect but **Statement II** is correct
(4) Both **Statement I** and **Statement II** are correct.

173. **Assertion :** If any protein encoding gene is expressed in a heterologous host it is called a recombinant protein.
Reason : In continuous culture system used medium is drained out from one side while fresh medium is added.
(1) Both assertion and reason are correct and reason is correct explanation.
(2) Assertion and reason are correct but reason is not correct explanation of assertion.
(3) Both assertion and reason are incorrect
(4) Assertion incorrect reason correct.

174. Identify correct labelling for A and B in given below figure -



(1) A - tet^R; B - amp^R
(2) A - amp^R; B - tet^R
(3) A - amp; B - tet
(4) A - lac z; B - amp^R

175. How many DNA molecules will be produced from one DNA molecule after 5 PCR cycles ?
(1) 10 (2) 15 (3) 32 (4) 42

176. 'Golden rice' is a genetically modified rice. It is an example of :
(1) biofortification
(2) pest-resistant crop
(3) increased mineral usage efficiency
(4) bioprospecting

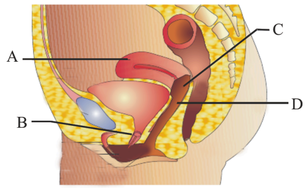
177. Production of thousands of plants though tissue culture method in called -
(1) Macropropagation (2) Micropropogation
(3) Somatic embryo (4) Totipotency

178. Degeneration of corpus luteum occurs due to inhibition of secretion of hormone :-
(1) FSH (2) LH
(3) Estrogen (4) Progesterone

179. Which is correct sequence of male genital tract ?
(1) Rete testis ⟶ Vas deferens ⟶ Vasa efferentia ⟶ Epididymis ⟶ Urethra
(2) Tubuli recti ⟶ Rete testis ⟶ Vas deferens⟶ Vasa efferentia ⟶ Seminal vesicle ⟶ Urethra
(3) Tubuli recti ⟶ Rete testis ⟶ Vasa efferentia ⟶ Vas deferens ⟶ Epididymis ⟶ Urethra
(4) Tubuli recti ⟶ Rete testis ⟶ Vasa efferentia ⟶ Epididymis ⟶ Vas deferens ⟶ Urethra

180. Fill in the blanks in the following statements.
The human male ejaculates about .... million sperms during a coitus of which, for normal fertility, at least .... percent sperms must have normal shape and size and at least .... percent of them must show vigorous motility.
(1) 400 - 500, 60, 40 (2) 100 - 120, 40, 60
(3) 200 - 300, 60, 40 (4) 200 - 300, 40, 60

181. It is a diagrammatic sectional view of female reproductive system. In it identify the site where the embryo develops ?



(1) A (2) B
(3) C (4) D

182. In a female undergoing hysterectomy (removal of uterus), which one of the following event will not occur?
(1) Formation of Graafian follicle
(2) Ovulation
(3) Menstruation
(4) Completion of meiosis-I and formation of secondary oocyte

183. In which of the following follicles, a cavity called the antrum appears with in the membrana granulosa very first time ?
(1) Primary follicle (2) Secondary follicle
(3) Tertiary follicle (4) Graafian follicle

184. Contraceptive oral pills help in birth control by :
(1) Killing the sperms in uterus
(2) Forming barrier between sperms and ovum.
(3) Preventing ovulation
(4) Killing the ovum

185. Which of the following contraceptive methods is least effective?
(1) Withdrawal
(2) IUDs
(3) Oral contraceptives
(4) Condoms

SECTION - B (ZOOLOGY)

186. Metamerism is the feature of :-
(1) Aschelminthes (2) Some mollusca
(3) Coelenterates (4) Annelida

187. (a) Parapodia help in flying & swimming.
(b) Radula is file like rasping organs for feeding.
(c) Malpighian tubules help in fertilisation.
(d) A soft and spongy layer of shell form a mantle over the visceral hump of molluscs.
How many of above are not correct –
(1) a, c & d (2) b, c & d
(3) c & d (4) a, b, d

188. Match the column-I with column-II & choose the correct option :-

	Column-I		**Column-II**
A.	1st cellular from of life	(i)	Nucleoprotein
B.	1st sign of life	(ii)	Version of a biogenesis theory
C.	Origin of universe	(iii)	2000 mya
D.	Origin of life	(iv)	Big bang theory

(1) A-(i), B-(iii), C-(ii), D-(iv)
(2) A-(iii), B-(i), C-(iv), D-(ii)
(3) A-(i), B-(ii), C-(iii), D-(iv)
(4) A-(ii), B-(i), C-(iv), D-(iii)

189. The state of heart when it is not pumping blood effectively enough to meet the needs of the body, is :-
(1) Heart attack (2) Cardiac arrest
(3) Angina pectoris (4) Heart Failure

190. Read the following statement (A-D) :-
(A) Artery always carry blood from heart to the organs
(B) Valves are absent in the arteries
(C) Artery always carry oxygenated blood
(D) Lumen of artery is wide
How many statements are wrong
(1) Three (2) Four (3) One (4) Two

191. Match the columns :–

	Column-I		**Column-II**
A.	Superior vena cava	p.	carries deoxygenated blood to lungs
B.	Inferior vena cava	q.	carries oxygenated blood from lungs
C.	Pulmonary artery	r.	Brings deoxygenated blood from lower part of body to right atrium
D.	Pulmonary vein	s.	Brings deoxygenated blood from upper part of body to right atrium

(1) A- q, B - s, C - r, D- p

(2) A - s, B - p, C - q, D- r

(3) A - s, B - r, C - p, D - q

(4) A - s, B - p, C - r, D - q

192. Cell fragments of megakaryocytes are :-

(1) Acidophil (2) Lymphocytes

(3) Neutrophil (4) Platelets

193. Name the blank space A, B, C & D given in the following table :-

Microbes name	**Commercial product**
A	Lactic acid
B	Cyclosporin-A
Penicillium notatum	C
Spirulina	D

(1) A-*Lactobacillus*, B-*Trichoderma*, C-Penicillin, D-Statin

(2) A-*Trichoderma*, B-Statins, C-Penicillin, D-Statins

(3) A-*Lactobacillus*, B-*Trichoderma*, C-Penicillin, D-Single cell protein

(4) A-*Lactobacillus*, B-*Trichoderma*, C-Penicillin, D- *Streptococcus*

194. Identify the **incorrect** statement related to gel electrophoresis.

(1) Separated DNA fragments can be directly seen under UV radiation

(2) Separated DNA can be extracted from gel piece

(3) Fragment of DNA moves toward anode

(4) Sieving effect of agarose gel helps in separation of DNA fragments

195. Select the correct statement

(1) Sexual reproduction preserves the genetic information

(2) Asexual reproduction permits variations

(3) The first restriction endonuclease was Hind-II

(4) Today we know more than 230 restriction enzymes.

196. Which of the following is not a critical research area in biotechnology?

(1) Providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.

(2) Creating optimal conditions through engineering for a catalyst to act.

(3) Downstream processing technologies to purify the protein/organic compound.

(4) Gene transfer technology using artifical vectors in strains of E. Coli.

197. How many structures in the list given below may show (22 + X) chromosomes?

Spermatid, secondary oocyte, primary spermatocyte, ovum, sperm, oogonium, spermatogonium, polar body

(1) Six

(2) Four

(3) Two

(4) Five

198. **Assertion (A) :** Infundibulum is a funnel shaped part of oviduct close to ovary.

Reason (R) : The edges of infundibulum helps in collection of the sperms.

(1) Both Assertion & Reason are correct & Reason is correct explanation of Assertion.

(2) Both Assertion & Reason are correct but Reason is not the correct explanation of Assertion.

(3) Assertion is correct but Reason is incorrect.

(4) Assertion is incorrect but Reason is correct.

199. Which of the following methods of contraception is effective only upto a maximum period of six months following parturition ?

(1) Coitus interruptus

(2) Lactational amenorrhoea

(3) Cu-T

(4) Condom

200. **Statement-I :** Barrier method is a natural contraceptive method which works on the principle of avoiding chances of ovum and sperm meeting.

Statement-II : Administration of progestogens or progestogen-estrogen combinations or IUDs within 72 hours of coitus have been found to be very effective as emergency contraceptives.

(1) Statement-I is correct and statement-II is incorrect.

(2) Both statement-I and statement-II are correct.

(3) Statement-I is incorrect and statement-II is correct.

(4) Both statement-I and statement-II are incorrect.

NING PROGRAMME
ssion : 2024-2025)

NEET (UG)
TEST # 06
22-12-2024

SERIES / JOINT PACKAGE COURSE
g/Pass Students

NIT TEST # 05

ना खोलें जब तक कहा न जाए।
t until you are asked to do so.
ढ़ें।
is Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1 and Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections. Section A** will consist of 35 questions (all questions are mandatory) and **Section B** will have 15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

ले में, अंग्रेजी संस्करण को अंतिम माना जाएगा।
uestion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature :

SECTION - A (PHYSICS)

1. Two identical spheres carrying charges –9μC and 5μC respectively are kept in contact and then separated from each other. Point out true statement from the following. On each sphere (after contact) :-

(1) 1.15×10^{13} electrons are in deficit

(2) 1.25×10^{13} electrons are in excess

(3) 2.15×10^{13} electrons are in excess

(4) 2.15×10^{13} electrons are in deficit

2. Unit of dielectric constant of a medium is :-

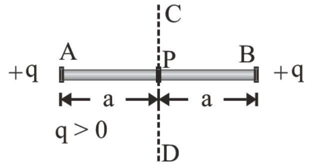
(1) coulomb/newton-metre

(2) newton-metre^2/coulomb^2

(3) coulomb^2/(newton-metre)^2

(4) none of the above

3. For the arrangement shown in the figure below, mark out the correct statement.



(1) For positive test charge, P is a position of stable equilibrium for displacement along AB.

(2) For positive test charge, P is a position of unstable equilibrium for displacement along CD.

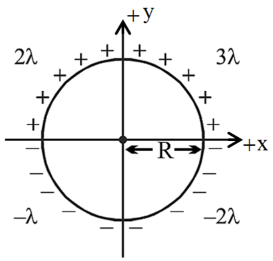
(3) For –ve test charge, P is a position of unstable equilibrium for displacement along AB.

(4) All of the above

4. A charge Q is placed at the centre of a square. If magnitude of electric field intensity due to the charge at the corner of square is E_1 and the magnitude of intensity at the midpoint of a side of square is E_2 then E_1/E_2 is:-

(1) $1/\sqrt{2}$ (2) $\sqrt{2}$ (3) 1/2 (4) 2

5. For a given ring, find electric field at centre (λ-linear charge density) :-



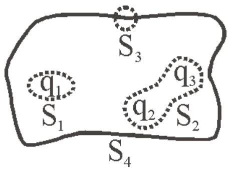
(1) $\frac{2\sqrt{2}k\lambda}{R}(-\hat{i})$

(2) $\frac{2\sqrt{2}k\lambda}{R}(-\hat{j})$

(3) $\frac{4k\lambda}{R}(-\hat{j})$

(4) $\frac{8k\lambda}{R}(-\hat{j})$

6. Three charges $q_1 = 1\mu C$, $q_2 = 2\mu C$ and $q_3 = -3\mu C$ and four surfaces S_1, S_2, S_3 and S_4 are shown in figure. The flux emerging through surface S_2 in N-m^2/C is -



(1) $36\pi \times 10^3$

(2) $-36\pi \times 10^3$

(3) $36\pi \times 10^9$

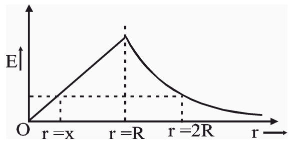
(4) $-36\pi \times 10^9$

7. The electric field at a distance R from the surface of a uniformely charged nonconducting sphere of radius R is 20V/m. The electric field at a distance $\frac{R}{2}$ from the centre of the sphere is :

(1) 40V/m (2) zero

(3) 20V/m (4) 10V/m

8. Variation in electric field for uniformly charged sphere is shown in figure then value of x :-



(1) $\frac{R}{3}$ (2) $\frac{R}{4}$

(3) $\frac{R}{2}$ (4) $\frac{3R}{8}$

9. There is a uniform field $\vec{E}$ in X-direction. If the work done on moving a charge 0.2 C through a distance of 2 m along a line making an angle 60° with the X-axis is 4.0 J, what is the value of $\vec{E}$?

(1) $\sqrt{3}$ N/C

(2) 4 N/C

(3) 5 N/C

(4) 20 N/C

10. Two negative charge, each of magnitude q are situated at 2r distance apart. A positive charge q is lying at the centre betweeen them. The potential energy of the system is U_1. If the two nearest charges are mutually interchanged and the potential energy becomes U_2, then $\frac{U_1}{U_2}$ will be :-

(1) 3 (2) 5

(3) 2 (4) 1

11. Two point charges +q and –q are held fixed at (–d, 0) and (d, 0) respectively of a (X, Y) coordinate system. Then choose correct statements

(a) E at all points on the Y-axis is along $\hat{i}$

(b) The electric field E at all points is along X-axis.

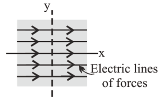
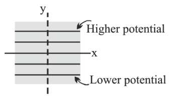
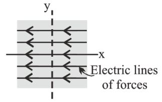
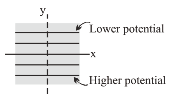
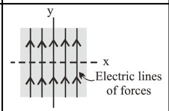
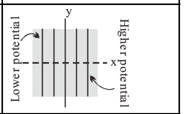
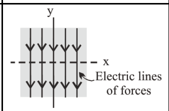
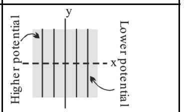
(c) Dipole moment is 2qd directed along $\hat{i}$

(d) No work has to be done in bringing a test charge from infinity to the origin along y-axis.

(1) a & b (2) b, c

(3) a, d (4) a, b and c

12. List I gives certain situations in which electric field is represented by electric lines of forces in x-y plane. List II gives corresponding representation of equipotential lines in x-y plane. Match the figures in List I with the figures in List II and indicate your answer.

List - I		**List - II**	
(P)		(1)	
(Q)		(2)	
(R)		(3)	
(S)		(4)	

	P	Q	R	S
(1)	1	2	3	4
(2)	4	3	2	1
(3)	3	4	2	1
(4)	2	1	3	4

13. We are able to obtain fairly large currents in a conductor because :-

(1) The electron drift speed is usually very large

(2) The number density of free electrons is very high and this can compensate for the low values of the electron drift speed and the very small magnitude of the electron charge

(3) The number density of free electrons as well as the electron drift speed are very large and these compensate for the very small magnitude of the electron charge

(4) The very small magnitude of the electron charge has to be divided by the still smaller product of the number density and drift speed to get the electric current

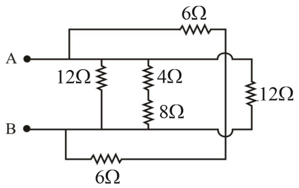
14. The specific resistance of the material of a wire is ρ and its volume is $3m^3$ and its resistance is 3Ω. The length of the wire will be :-

(1) $\sqrt{\frac{1}{\rho}}$ (2) $\frac{3}{\sqrt{\rho}}$ (3) $\frac{\sqrt{3}}{\rho}$ (4) $\frac{\rho}{\sqrt{3}}$

15. Resistance of a wire is 20 Ω. If it is bent in shape of square the resistance across its diagonal is R_1. If it is bent in shape of circle then resistance across its diameter is R_2 then find $\frac{R_1}{R_2}$?

(1) 1 (2) $\frac{2}{\pi}$ (3) $\frac{\pi}{2}$ (4) $\frac{\pi}{3}$

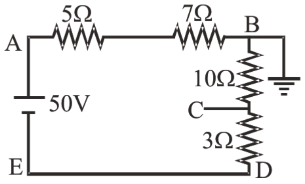
16. The equivalent resistance across AB in the given network is :-



(1) 4 Ω (2) 3 Ω

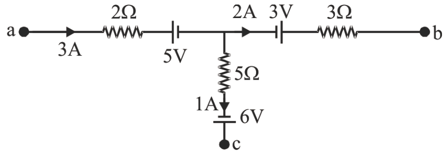
(3) 12 Ω (4) 4/3 Ω

17. In the circuit shown, the point 'B' is earthed. The potential at the point 'A' is :-



(1) 14 V (2) 24 V (3) 26 V (4) 50 V

18. Find the potential difference ($V_a - V_b$) between a and b in the given circuit



(1) 14 V (2) 17 V

(3) 12 V (4) –14V

19. The resistance of a galvanometer is 90 ohm. If only 10 percent of the main current may flow through the galvanometer, in which way and of what value, a resistor is to be used :

(1) 10 ohm in series

(2) 10 ohm in parallel

(3) 810 ohm in series

(4) 810 ohm in parallel

20. Internal resistance of primary cell depends on :-

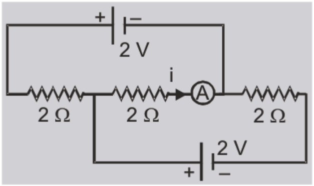
(1) the nature of electrolyte (concentration)

(2) the area of plates immeresed in the electrolyte

(3) the concentration of electrolyte and distance between the plates

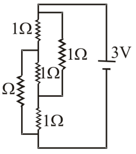
(4) all the above

21. Reading of ammeter for the following circuit is :-

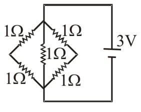


(1) 1 A (2) $\frac{1}{2}$ A (3) $\frac{2}{3}$ A (4) 3 A

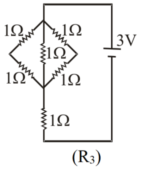
22. Figure shows three resistor configurations R_1, R_2 and R_3 connected to 3V battery. If the power dissipated by the configuration R_1, R_2 and R_3 is P_1, P_2 and P_3 respectively.



(R₁)



(R₂)



(R₃)

(1) $P_1 > P_2 > P_3$

(2) $P_1 > P_3 > P_2$

(3) $P_2 > P_1 > P_3$

(4) $P_3 > P_2 > P_1$

23. In india electricity is supplied for domestic use at 220V. It is supplied at 110V in USA. If resistance of 60W bulb for use in India is R, then the resistance of 60W bulb for use in USA will be :-

(1) R (2) 2R

(3) $\frac{R}{4}$ (4) $\frac{R}{2}$

24. In a wheatstone's bridge P = 9 ohm, Q = 11 ohm, R = 4 ohm and S = 6 ohm. How much resistance must be put in parallel to the resistance S to balance the bridge :-

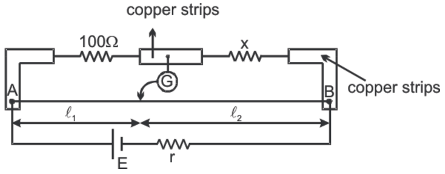
(1) 24 ohm

(2) $\frac{44}{9}$ ohm

(3) 26.4 ohm

(4) 18.7 ohm

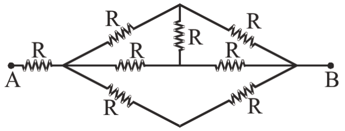
25. In a practical wheat stone bridge circuit as shown, when one more resistance of 100 Ω is connected in parallel with unknown resistance 'x', then ratio ℓ_1/ℓ_2 become '2'. ℓ_1 is balance length. AB is a uniform wire. Then value of 'x' must be:



(1) 50 Ω` (2) 100 Ω

(3) 200 Ω (4) 400 Ω

26. In the network of resistances as shown in figure. the effective resistance between points A and B is :-



(1) 8 R (2) 5R

(3) (5/3) R (4) (8/3) R

27. ***Assertion* (A) :-** When constant current is passing through a conductor of variable area of cross section, electric field inside conductor is inversely proportional to cross sectional area.

***Reason* (R) :-** Microscopic form of Ohm's law is $\rho\vec{E} = \vec{J}$ where $\vec{E}$ stands for electric field, ρ stands for resistivity, and $\vec{J}$ stands for current density.

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

28. A 20μF capacitor in a defbrillator is charged to 2000 V. The energy stored in the capacitor is sent through the patient during a pulse of duration 4ms the power delivered to the pateints is :-

(1) 10 kW (2) 20 kW

(3) 30 kW (4) 40 kW

29. The charges on the plates of an isolated capacitor are ± Q and the potential difference between the plates is V. Now if we increase the distance between the plates to double of the original value, then

(1) Charge on the plates remains the same

(2) Capacitance of the capacitor is halved

(3) Potential difference doubles

(4) All of the above

30. Two conductor spheres of radii R_1 and R_2 having charges Q_1 and Q_2 respectively are connected to each other. There is :

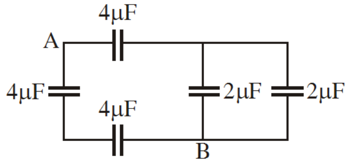
(1) No change in the energy of the system

(2) An increase in the energy of the system

(3) Always a decrease in the energy of the system

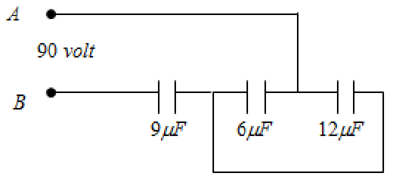
(4) A decrease in the energy of the system of the system unless $Q_1R_2 = Q_2R_1$

31. In the circuit as shown in the figure the effective capacitance between A and B is



(1) 3μF (2) 2μF (3) 4μF (4) 8μF

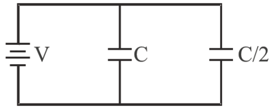
32. The capacity of the capacitors are shown in the adjoining fig. The equivalent capacitance between the points *A* and *B* and the charge on the 6 μ*F* will be



(1) 27 μ*F*; 540 μ*C* (2) 15 μ*F*; 270 μ*C*

(3) 6 μ*F*; 180 μ*C* (4) 15 μ*F*; 90 μ*C*

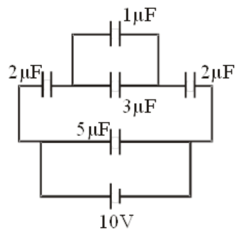
33. Two condensers, one of capacity C and other of capacity C/2 are connected to a V volt battery, as shown in adjoining figure. The work done in charging fully both the condensers is :



(1) $\frac{1}{4}$ CV ^{2} (2) $\frac{3}{2}$ CV ^{2}

(3) $\frac{1}{2}$ CV ^{2} (4) 2CV^2

34. The ratio of potential difference between 1 μF and 5 μF capacitors -



(1) 1 : 2 (2) 4 : 5 (3) 1 : 5 (4) 1 : 4

35. In order to obtain a time constant of 10 seconds in an RC circuit containing a resistance of 10^3 ohm, the capacity of a condenser should be

(1) 10 μF (2) 100 μF

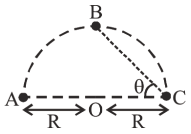
(3) 1000 μF (4) 10000 μF

SECTION - B (PHYSICS)

36. Two identical balls having like charges and placed at a certain distance apart repel each other with a certain force. They are brought in contact and then moved apart to a distance equal to half their initial separation. The force of repulsion between them become 4.5 times in comparison with the initial value. The ratio of the initial charges of the balls is :

(1) 2 (2) 3 (3) 4 (4) 6

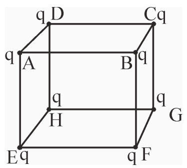
37. 3 equal point charges (each of Q) are placed at A, B, C (along arc ABC) if θ = 45° then net force on B is :-



(1) $\frac{kQ^2}{R^2}$ (2) $\frac{\sqrt{2}kQ^2}{R^2}$

(3) $\frac{kQ^2}{\sqrt{2}R^2}$ (4) Zero

38. Eight point charges having magnitude q are fixed at vertices of a cube.



Statement - 1 : electric flux through square surface ABCD of the cube is $\frac{q}{24\epsilon_0}$

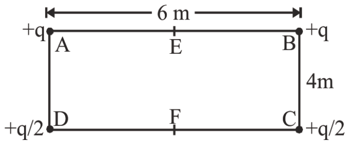
Statement - 2 : electric flux through cube is $\frac{q}{\epsilon_0}$.

Statement - 3 : electric flux through square surface EFGH of the cube is $\frac{q}{6\epsilon_0}$

Which of the following statement are correct :

(1) 1 & 2 (2) 2 & 3 (3) 1 & 3 (4) All

39. Find the potential difference between the points E and F in the adjoining figure. Assume E and F are the mid points of AB and DC respectively :-



(1) $(1.2 \times 10^9$ q) volt

(2) $(1.8 \times 10^9$ q) volt

(3) $(1.5 \times 10^9$ q) volt

(4) $(3 \times 10^9$ q) volt

40. A charged spherical shell of diameter 4 cm has a charge density of 10^{-4} coulomb/cm^2. The work done in joule when a charge of 40 nano-coulombs is moved from infinity to a point which is at a distance of 2 cm from the surface of the sphere is :-

(1) 14.4 π (2) 28.8 π

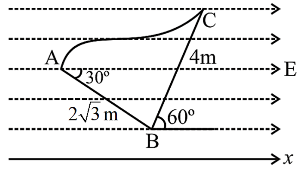
(3) 144 π (4) 288 π

41. A large hollow metallic sphere A(of radius R) is positively charged to a potential of 100 V and a small sphere B (of radius R/5) is also positively charge to a potential of 100 V. Now B is placed inside A and they are connected by a wire. The final potential of A will be :-

(1) 200 V (2) 150 V

(3) 120 V (4) None of above

42. In a certain region, electric field E exists along the x-axis which is uniform. Given AB = $2\sqrt{3}$m, BC = 4 m. Points A, B, C are in the x – y plane.



Find the potential difference V_A-V_B between the points A and B :

(1) E (2) 2E (3) 3E (4) 4E

43. A toy car of mass 1kg with charge q moves on a frictionless horizontal plane surface under the influence of a uniform electric field E. Due to the force qE, its velocity increases from 0 to 6 m/s in one second duration. At that instant the direction of the field is reversed. The car continues to move for two more seconds under the influence of this field. The change in momentum and the change in kinetic energy of the toy car between 1 to 3 seconds are respectively :-

(1) –12 kgm/s, 0 J

(2) 1 kgm/s, 3 J

(3) 12 kgm/s, 12J

(4) 1.5 kgm/s, 0 J

44. A potential difference of 200 V is applied to a coil at a temperature of 15°C and the current is 10A. What will be the mean temperature of the coil when the current has fallen to 5A, the applied voltage being the same as before :-

(Given $\alpha = \frac{1}{234}C^{-1}$ at 0°C)

(1) 254°C

(2) 256°C

(3) 258°C

(4) 264°C

45. The same mass of copper is drawn into two wires 2mm and 3mm thick. The two wires are connected in series and current is passed through them. The ratio of heats produced in the two wires is :–

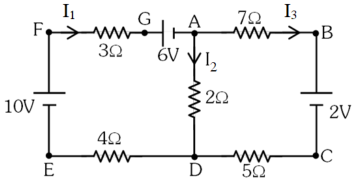
(1) $\frac{9}{4}$

(2) $\frac{3}{2}$

(3) $\frac{2}{3}$

(4) $\frac{81}{16}$

46.



KVL equation in loop ADEFGA and ABCDEFGA?

(1) $-5I_1 + 4I_2 + 5 = 0$ and $-7I_1 + 12I_3 + 4 = 0$

(2) $-7I_1 - 2I_2 + 4 = 0$ and $-7I_1 - 12I_3 + 2 = 0$

(3) $2I_1 + 4I_2 = 0$ and $6I_1 + 12I_3 - 2 = 0$

(4) $I_1 + 5I_2 - 3 = 0$ and $3I_1 - 6I_3 + 4 = 0$

47. Consider two identical cells each of emf E and internal resistance r connected to a load resistance R.

	Column-I		Column-II
(i)	Maximum power transfer to load if cells are connected in series	(p)	$\frac{E^2}{4r}$
(ii)	Maximum power transfer to load if cells are connected in parallel	(q)	$\frac{E^2}{2r}$
(iii)	For series combination of cells	(r)	$E_{eq} = E, r_{eq} = \frac{r}{2}$
(iv)	For parallel connection of cells	(s)	$E_{eq} = 2E, r_{eq} = 2r$

Now, match the given columns and select the correct option from the codes given below :

Code :

(1) i-p, ii-q, iii-p, iv-s

(2) i-r, ii-p, iii-q, iv-s

(3) i-q, ii-q, iii-s, iv-r

(4) i-p, ii-p, iii-q, iv-s

48. A galvanometer has a coil of resistance 100 Ω showing a full–scale deflection at 50 μA. Consider following statements.

(A) The resistance needed to use it as a voltmeter of range 50 volt is 10^6 Ω.

(B) The resistance needed to use it as a voltmeter of range 50 volt is 10^5 Ω

(C) The resistance needed to use it as an ammeter of range 10 mA is 0.5 Ω

(D) The resistance needed to use it as an ammeter of range 10 mA is 1.0 Ω

Select correct alternative :-

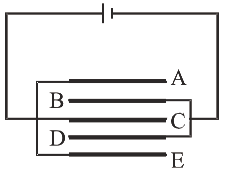
(1) Only A, D

(2) Only A, C

(3) Only B, D

(4) Only B, C`

49. Five identical plates are arranged such that they make four capacitors each of 2μF. The plates are connected to a source of voltage 10V. The total charge on plate C is :-



(1) +20μC (2) +40μC

(3) +60μC (4) +80μC

50. The plates of a parallel plate capacitor are charged up to 100 volt. A 2 mm thick plate is inserted between the plates, then to maintain the same potential difference, the distance between the capacitor plates is increased by 1.6 mm. The dielectric constant of the plate is :-

(1) 5 (2) 1.25

(3) 4 (4) 2.5

SECTION - A (CHEMISTRY)

51. In the compound $CoCl_3.5NH_3$,

(1) All the Cl are ionises in aqueous solution.

(2) Two Cl are ionises and one Cl make secondary valency (SV) only.

(3) Two Cl are ionises and one Cl make PV as well as SV.

(4) Any Cl are not ionised and make SV.

52. For which of the following d^n configuration of octahedral complex (es), cannot exist in both high spin and low spin forms.

(i) d^3 (ii) d^5 (iii) d^6 (iv) d^8

(1) ii and iii

(2) i and iii

(3) i and iv

(4) iii and iv

53. Match correct option.

	List-I (Complex compound)		List-II (Hybridization & Magnetic Property)
(A)	$[CoF_6]^{3-}$	(M)	sp^3d^2, paramagnetic
(B)	$[Mn(CN)_6]^{3-}$	(N)	sp^3d^2, diamagnetic
(C)	$[Co(C_2O_4)_3]^{3-}$	(O)	d^2sp^3, paramagnetic
(D)	$[Zn(H_2O)_6]^{2+}$	(P)	d^2sp^3, diamagnetic

(1) A⟶M, B⟶N, C⟶O, D⟶P

(2) A⟶M, B⟶P, C⟶N, D⟶O

(3) A⟶M, B⟶P, C⟶O, D⟶N

(4) A⟶M, B⟶O, C⟶P, D⟶N

54. Match the following -

	Column-I		Column-II
(i)	Square planar	(a)	$[NiCl_4]^{2-}$
(ii)	Tetrahedral	(b)	$[Ni(CN)_4]^{2-}$
(iii)	Trigonal Bi-pyramidal	(c)	$[Fe(CO)_5]$
(iv)	Octahedral	(d)	$[Fe(CN)_6]^{4-}$

(1) (i)-b, (ii)-a, (iii)-c, (iv)-d

(2) (i)-d, (ii)-c, (iii)-a, (iv)-b

(3) (i)-b, (ii)-a, (iii)-d, (iv)-c

(4) (i)-b, (ii)-c, (iii)-a, (iv)-d

55. The sum of coordination number and oxidation number of the metal M in the complex $[Co(EDTA)]^{-1}$

(1) 9 (2) 6

(3) 4 (4) 1

56. Of the following complex, which is paramagnetic in nature?

(1) $[CoF_6]^{3-}$ (2) $[Co(OX)_3]^{-3}$

(3) $[Ni(CO)_4]$ (4) $[Co(H_2O)_6]^{+3}$

57. The fac-mer isomerism exhibited by

(1) $[Co(NH_3)_4Cl_2]^+$

(2) $[Co(NH_3)_3 (NO_3)_3]$

(3) $[Co(gly)_3]$

(4) $[Co(EDTA)]$

58. The existence of two different coloured complexes with the composition of $[Co(en)_3]^{+3}$ is due to :-

(1) Geometrical isomerism

(2) Optical isomerism

(3) Linkage isomerism

(4) Ionisation isomerism

59. Which of the following is not correctly matched?

	Complex	Isomerism
(1)	$[Co(NH_3)_6][Cr(CN)_6]$ & $[Cr(NH_3)_6][Co(CN)_6]$	Coordination isomerism
(2)	$[Pt(NH_3)_2(NO_2)_2]$ & $[Pt(NH_3)_2(ONO)_2]$	Linkage isomerism
(3)	$[Cr(H_2O)_6]Cl_3$ & $[Cr(H_2O)_5Cl]Cl_2 . H_2O$	Hydration isomerism
(4)	$[Cr(H_2O)_4Br]$ I & $[Cr(H_2O)_4Cl_2]Br$	Ionisation isomerism

60. The EAN of $[Fe(H_2O)_5NO]SO_4$ is :

(1) 37

(2) 35

(3) 36

(4) 25

61. Choose incorrect match

(1) $[Co(CO)_4]^-$ diamagnetic

(2) $[Ni(CN)_4]^{2-}$ square planer

(3) $Na_2[Fe(CN)_5NO]$ Diamagnetic

(4) $[Fe(H_2O)_5NO]SO_4$ Sodiumnitroprusside

62. **Assertion (A) :-** On heating $[Ti(H_2O)_6]Cl_3$, it becomes colourless.
Reason (R) :- The complex does not have unpaired electrons.

(1) Both A and R are true and R is correct explanation of A.

(2) Both A and R are true and R is not correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

63. **Assertion :** Geometrical isomerism is not possible in tetrahedral complex having two different unidentate ligands coordinated with central metal ion.
Reason : Tetrahedral complexes do not show geometrical isomerism because the relative position of unidentate ligands attach to central metal atom are same w.r.t. each other.

(1) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

(2) Both **Assertion** and **Reason** are true but **Reason** is not the correct explanation of **Assertion**.

(3) **Assertion** is true, **Reason** is false.

(4) **Assertion** is false, **Reason** is true.

64. Hypo solution reacts with AgBr to form which complex ion ?

(1) $[Ag(S_2O_3)_2]^{3-}$ (2) $[AgS_2O_3]^{-1}$

(3) $[Ag_2(S_2O_3)_3]^{4-}$ (4) $[Ag_2S_2O_3]^{2-}$

65. Dimethyl glyoxime is used for the test of ______ in alkaline medium.

(1) Co^{+2} (2) Zn^{+2}

(3) Mn^{+2} (4) Ni^{+2}

66. In the given complex $[Fe(C_2O_4)_3]^{-3}$ and $[Co(en)_3]^{+3}$ the coordination number of Fe and Co are respectively

(1) 3,3 (2) 6, 6

(3) 3, 6 (4) 6, 3

67. **Statement-I :-** Complex which contain identical ligand are homoleptic complex.

Statement-II :- Homoleptic complex may be cationic, anionic and neutral complex.

(1) Statement-I and statement-II both are correct

(2) Statement-I and statement-II both are incorrect

(3) Statement-I correct but statement-II incorrect

(4) Statement-I incorrect but statement-II correct

68. Which of the following is not a ligand?

(1) NH_3 (2) NH_4^+

(3) NH_2^- (4) NH^{-2}

69. Given below are two statements :

Statement I : $[Co(NH_3)_6]^{3+}$ is a homoleptic complex whereas $[Co(NH_3)_4Cl_2]^+$ is a heteroleptic complex.

Statement II : Complex $[Co(NH_3)_6]^{3+}$ has only one kind of ligands but $[Co(NH_3)_4Cl_2]^+$ has more than one kind of ligands.

In the light of the above statements, choose the *correct* answer from the options given below.

(1) Both Statement I and Statement II are true.

(2) Both Statement I and Statement II are false.

(3) Statement I is true but Statement II is false.

(4) Statement I is false but Statement II is true.

70. Which of the following is **not** an ambidentate ligand?

(1) $C_2O_4^{2-}$ (2) SCN^-

(3) NO_2^- (4) CN^-

71. $[Mn_2(CO)_{10}]$ and $[Co_2(CO)_8]$ both structures have :

A. Metal - Metal linkage

B. Terminal CO groups are presents.

C. Bridging CO groups

D. Metal in zero oxidation state

Choose the **correct** answer from the options given below :

(1) Only A, B, C

(2) Only B, C, D

(3) Only A, C, D

(4) Only A, B, D

72. Match **List-I** with **List-II :**

	List-I (Atom/Molecules)		List-II (Property)
(A)	Nitrogen atom	I.	Paramagnetic
(B)	Fluorine molecule	II.	Most reactive element in group 18
(C)	Oxygen molecule	III.	Element with highest ionisation enthalpy in group 15
(D)	Xenon atom	IV.	Strongest oxidising agent

Identify the **correct** answer from the options given below :

(1) A-III, B-I, C-IV, D-II

(2) A-I, B-IV, C-III, D-II

(3) A-II, B-IV, C-I, D-III

(4) A-III, B-IV, C-I, D-II

73. Identify the **incorrect** statement :

(1) Boron trioxide is acidic, aluminium and gallium trioxides are amphoteric while indium and thallium trioxides are basic.

(2) The hybridisation of Al in $[Al(H_2O)_6]^{3+}$ is d^2sp^3.

(3) Two isotopes of Boron, namely $^{10}B(19\%)$ and $^{11}B(81\%)$ are known.

(4) The relative stability of group 13 elements in +1 oxidation state varies as $Al < Ga < In < Tl$.

74. Among Group 16 elements, which one does **NOT** show −2 oxidation state ?

(1) O (2) Se (3) Te (4) Po

75. **Assertion :** Reducing nature of pnicogen hydrides increases on moving down the group.
Reason : Thermal stability of pnicogen hydrides decreases on moving down the group.

(1) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.

(2) **Assertion** is true but **Reason** is false.

(3) **Assertion** is false but **Reason** is true.

(4) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

76. Incorrect statement for nitrogen is :

(1) General valency is 3.

(2) Maximum covalency is 4.

(3) Minimum and maximum oxidation state are −3 and +5.

(4) It can increase its covalency by accepting lone pair.

77. Choose incorrect match.

	Column-I	**Column-II**
(1)	PbF_4, SnF_4	Ionic in nature
(2)	$[SiF_6]^{-2}$	sp^3d^2 Hybridisation
(3)	GeO	Acidic
(4)	SiO_2	Amphoteric

78. Match column-I & II :-

	Column-I (Halogens)		**Column-II (Property)**
(i)	$F_2 > Cl_2 > Br_2 > I_2$	(p)	Bond dissociation energy
(ii)	Cl > F > Br > I	(q)	Electronegativity
(iii)	$Cl_2 > Br_2 > F_2 > I_2$	(r)	Reactivity
(iv)	F > Cl > Br > I	(s)	Electron Gain enthalpy

(1) (i)-r, (ii)-s, (iii)-p, (iv)-q

(2) (i)-s, (ii)-r, (iii)-p, (iv)-q

(3) (i)-r, (ii)-s, (iii)-q, (iv)-p

(4) (i)-s, (ii)-r, (iii)-q, (iv)-p

79. Which of the following oxides are amphoteric in nature :

(i) SiO_2 (ii) GeO_2 (iii) SnO_2 (iv) PbO_2

(1) (i) & (ii)

(2) (ii) & (iii)

(3) (ii) & (iv)

(4) (iii) & (iv)

80. Which element has least MP in 13th group :-

(1) B (2) Al (3) Ga (4) In

81. Which of the following are metalloid ?

(A) As (B) Bi (C) Ge (D) Te (E) I

(1) A, B and C only (2) E, B, C and D only

(3) A & C only (4) A, C & D only

82. Which compound of krypton is studied in detail ?

(1) KrF_4 (2) KrO_2

(3) KrF_2 (4) KrO_4

83. Which of the following halides does not hydrolysed at room temperature ?

(1) $PbCl_4$ (2) $SiCl_4$

(3) CCl_4 (4) $SnCl_4$

84. Choose the correct statement :

(1) GeX_4 is less stable than GeX_2

(2) PbX_2 is more stable than PbX_4

(3) TlX_3 is more stable than TlX

(4) SnX_2 is more stable than SnX_4

85. Which of the following dimers formed undergoes disproportionation :

(1) S_2F_2 (2) Se_2Cl_2

(3) S_2Br_2 (4) All of these

SECTION - B (CHEMISTRY)

86. Which of the following ion is expected to absorb visible light ?

(1) $[Ti(H_2O)_6]^+$ (2) $[Sc(H_2O)_3(NH_3)_3]^{+3}$

(3) $[Ti(en)_2(NH_3)_2]^{+4}$ (4) $[TiF_6]^{2-}$

87. Pt(IV) chloride forms several octahedral complexes with ammonia. Which of the following will not give test of chloride ions with silver nitrate at 25°C?

(1) $PtCl_4.6NH_3$ (2) $PtCl_4.5NH_3$

(3) $PtCl_4.3NH_3$ (4) $PtCl_4.2NH_3$

88. Pick out the correct statement regarding $[Ni(NH_3)_4(H_2O)_2]^{+2}$ is

(1) It is sp^3d^2 hybridised & $t_{2g}{}^6eg^2$ configuration

(2) It is d^2sp^3 hybridised & $t_{2g}{}^4eg^4$ configuration

(3) It is dsp^2 hybridised & $t_{2g}{}^6eg^2$ configuration

(4) It is dsp^3 hybdirised & $t_{2g}{}^4eg^4$ configuration

89. Choose incorrect option regarding $K_4[Fe(CN)_6]$?

(1) $t_{2g}^6eg^0$ configuration

(2) $\frac{-12}{5}\Delta_0 + 2p$ Crystal field stabilisation energy

(3) dissociate into four ion

(4) exhibit linkage isomerism

90. In a following chemical reaction

$$\underset{\text{(Pink)}}{Na_2[Fe(CN)_5NO]} \xrightarrow{Na_2S} \underset{\text{V oilet}}{Na_4[Fe(CN)_5NOS]}$$

change in oxidation state of Fe is :-

(1) 2 (2) 0

(3) 3 (4) 1

91.

	Column-I (Formula)		**Column - II** (Moles of AgCl precipitated per mole of the compound with excess of $AgNO_3$)
(i)	$CoCl_3.4NH_3$	(P)	2
(ii)	$NiCl_2.6\ H_2O$	(Q)	1
(iii)	$PtCl_2 . 2NH_3$	(R)	0
(iv)	$PtCl_4 . 2HCl$	(S)	3

Correct Match is -

(1) i → R, ii → Q, iii → S, iv → P

(2) i → Q, ii → P, iii → R, iv → R

(3) i → P, ii → Q, iii → R, iv → S

(4) i → S, ii → R, iii → R, iv → Q

92. Which of the following is incorrectly matched ?

	Complex	Number of unpaired electrons
(1)	$[FeF_6]^{-3}$	5
(2)	$[Cr(en)_3]^{+2}$	2
(3)	$[Co(NH_3)_6]^{3+}$	4
(4)	$[Mn(H_2O)_6]^{2+}$	5

93. Select correct pair of complexes that exhibit same type of isomerism :

(1) $[Co\ Br(NH_3)_5]Cl_2$, $[Ir\ Br_3(H_2O)_3]$

(2) $[Cr(NO_2)_2\ (en)_2]^+$, $[Rh(SCN)\ (H_2O)(OX)_2]^{2-}$

(3) $[Pt\ (gly)\ (NH_3)\ (H_2O)]^+$, $[Zn\ (gly)\ (NH_3)_2]^+$

(4) $[CoCl_2(NH_3)_4]^+$, $[Cr\ Br(H_2O)_5]Br_2$

94. Given below are two statements :

Statement I : Both $[Co(NH_3)_6]^{+3}$ and $[CoF_6]^{3-}$ complexes are octahedral but differ in their magnetic behaviour.

Statement II : $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both statement I and Statement II are true

(2) Both Statement I and Statement II are false

(3) Statement I is true but Statement II is false

(4) Statement I is false but Statement II is true

95. Ethylene diaminetetraacetate ion is a/an :

(1) hexadentate ligand (2) ambidentate ligand

(3) monodentate ligand (4) bidentate ligand

96. Identify the **incorrect** statement from the following:

(1) The acidic strength of HX(X = F, Cl, Br and l) follows the order : HF > HCl > HBr > HI

(2) Fluorine exhibits −1 oxidation state whereas other halogens exhibit +1, +3, +5 and +7 oxidation states also.

(3) The enthalpy of dissociation of F_2 is smaller than that of Cl_2

(4) Fluorine is stronger oxidising agent than chlorine.

97. **Assertion :** PbI_4, $BiCl_5$, FeI_3, CuI_2 are do not exist.
Reason : Higher oxidation state of metal ions are strong oxidising agent which give redox reaction with Iodide ion.

(1) Both **Assertion** and **Reason** are true but **Reason** is not the correct explanation of **Assertion**.

(2) **Assertion** is true but **Reason** is false.

(3) **Assertion** is false but **Reason** is true.

(4) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

98. following order is not for :
$HClO < HClO_2 < HClO_3 < HClO_4$

(1) Acidic nature

(2) Stability of oxo acid

(3) Oxidising nature

(4) Stability of anions

99. Consider the following statements :-

(A) For nitrogen family tendency to exhibit –3 oxidation state decreases down the group.

(B) For nitrogen all oxidation states from +1 to +4 tends to disproportionate in basic solution.

(C) Maximum covalency of nitrogen is 5.

(D) BiH_3 is the strongest reducing agent amongst hydrides of 15th group.

Correct statements are :-

(1) A & B only　(2) B & C only

(3) C & D only　(4) A & D only

100. Nitrogen differs from the rest of the members of this group due to :
(a) Small Size
(b) Low electronegativity
(c) High ionisation enthalpy
(d) Availability of d orbitals

(1) a, b and c only　(2) a and c only

(3) a, c and d only　(4) a, b, c and d all

SECTION - A (BOTANY)

101. $A + CO_2 \xrightarrow{B} 2 \times 3 - PGA$
Here A and B are respectively ?

(1) Malic acid, PEP carboxylase

(2) RuBiSCo, RuBP

(3) RuBP, RuBisCO

(4) Glucose, Hexokinase

102. In C_4 plants, Calvin cycle enzymes are present in :-

(1) Chloroplasts of mesophyll cells

(2) Chloroplasts of bundle sheath cells

(3) Cytoplasm of guard cells

(4) Cytoplasm of epidermal cells

103. Absorption of light, photolysis of water, photo phosphorylation, photoreduction. From the above how many process common in both cyclic & noncyclic ETS :-

(1) One　(2) Two

(3) Three　(4) Four

104. What is the proton Channel of ATP synthesizing system of thylakoid membranes :

(1) f_0　(2) f_1

(3) cf_0　(4) cf_1

105. Photorespiration occurs in:

(1) Chloroplast　(2) Peroxysome

(3) Mitochondria　(4) All

106. Light is necessary in photosynthesis of plant for:-

(1) Split carbon dioxide.

(2) Release energy in the form of ADP for cell.

(3) Reduction of carbon dioxide to produce glucose.

(4) Combine CO_2 and O_2

107. Photochemical reactions (Light reactions) takes places at-

(1) Thylakoids Lamella

(2) Stroma of Chloroplast

(3) Matrix of mitochondria

(4) Cytoplasm

108. Which of the following is not a step of calvin cycle ?

(1) Decarboxylation　(2) Carboxylation

(3) Regeneration　(4) Reduction

109. Which one of the following has highest gross calorific value ?

(1) Carbohydrate　(2) Protein

(3) Fat　(4) Organic acids

110. Find odd one out with respect to number of carbon present in substrate :

(1) Succinyl Co-A　(2) Succinate

(3) Fumarate　(4) Oxalo succinate

111. Which of the following are the products of oxidative decarboxylation of pyruvic acid in mitochondria ?

(1) Acetyl CoA, CO_2, $FADH_2$

(2) CO_2 , $FADH_2$, $NADH+H^+$

(3) CO_2, Malic acid, $NADH+H^+$

(4) CO_2, $NADH+H^+$, Acetyl CoA

112. Which of the following complex of E.T.S receive electrons from both complex I & II ?

(1) Complex III

(2) NADH dehydrogenase

(3) Cytochrome b_6f

(4) O_2

113. How much of energy is being released during fermentation?

(1) <7%　(2) 10-15%

(3) 20-25%　(4) >40%

114. Aerobic respiratory pathway is appropriately termed :

(1) Parabolic　(2) Amphibolic

(3) Anabolic　(4) Catabolic

115. Consider the following reaction :-
$6H_2O + 6O_2 + C_6H_{12}O_6 \longrightarrow 6CO_2 + 12H_2O$
RQ for this process is :-

(1) 0.7　(2) 0.9

(3) 1　(4) > 1

116. Which among the following is not located in inner mitochondrial membrane.

(1) Succinate dehydrogenase

(2) Cyt b_6 – Cyt f

(3) Cyt a – Cyt a_3

(4) $F_0 - F_1$ ATP Synthase.

117. (A) NADH is oxidised to NAD^+ rather slowly in fermentation.
(B) Pure proteins and fats are never used as respiratory substrate.

(1) Both A and B are correct

(2) Both A and B are incorrect

(3) Only A is correct

(4) Only B is correct

118. How many of the following respiratory reactions occur in cytoplasm of eukaryotic cell?
(a) PGAL ⟶ 1, 3 di PGA
(b) Succinyl CoA ⟶ Succinic acid
(c) Pyruvic acid ⟶ Acetyl CoA
(d) PEP ⟶ Pyruvate
(e) F 1, 6 di phosphate ⟶ DHAP + 3PGAL

(1) a and e only

(2) a, d and e only

(3) a, b, c and e only

(4) a and d only

119. **Statement-I :** The carbon skeleton produced during respiration is used as precursors for biosynthesis of other molecules in cell.

Statement-II : Plants, unlike animals, have no specialised organs for gaseous exchange but they have stomata and lenticels for this purpose.

(1) Only statement I is correct

(2) Only statement II is correct

(3) Both statement I and II are correct

(4) Both statement I and II are incorrect.

120. (A) Essential role of air in the growth of green plants described by Joseph Priestley.

(B) Jan Igenhousz provided evidences for production of glucose during growth of green plants.

(1) Both A and B are correct

(2) Both A and B are incorrect

(3) Only A is correct

(4) Only B is correct

121. What is incorrect for cyclic photophosphorylation?

(1) P_{700} is photoexited

(2) ATP is synthesized

(3) $NADP^+$ is reduced

(4) PS-II is not involved

122. **Assertion :** Immediately after light becomes unavailable, the biosynthesis process continues for some time, and then stops.

Reason : Biosynthetic phase of photosynthesis does not directly depend on light but is dependent on the products of light reaction.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

123. Read the following four statements (A - D) :-

(A) There is a linear relationship between light and CO_2 fixation rate at low light intensity but at high light intensity it is not

(B) Current availability of CO_2 is limiting to the C_3 plants because they show CO_2 saturation at 360 $\mu L L^{-1}$ concentration.

(C) Light reactions of photosynthesis are less affected by temperature as compare to dark reactions

(D) As a factor water mainly show indirect effect on photosynthesis

Which of the above statement(s) is/are right ?

(1) A, C, D (2) Only B

(3) B and C (4) Only A

124. How many oxygen atoms will be required in ETS to oxidise intermediates generated only in mitochondrial matrix during breakdown of a sucrose molecule ?

(1) 5 (2) 10

(3) 15 (4) 20

125. Which one is absent in process of photosynthesis that occurs in the stroma lamellae membrane lacks :-

(1) Photosystem - I

(2) Electron transport system

(3) NADP reductase enzyme

(4) ATP synthase

126. Select the incorrect statement about non-cyclic photophosphorylation :-

(1) In PS-II the reaction centre Chl-a absorbs 680 nm wavelength of red light

(2) PS-I and PS-II both are involved

(3) $NADP^+$ is reduced to $NADPH + H^+$

(4) The excited electron does not pass on to $NADP^+$ but is cycled back to the PS-I complex through the ETS

127. Which one of the following is a C_4 plant ?

(1) Papaya (2) Potato

(3) Maize (4) Pea

128. Glycolate cycle occurs in which of the following organelle(s)?

(1) Glyoxysome

(2) Sphaerosome

(3) Peroxisome, Lysosome, Glyoxysome

(4) Peroxisome, Mitochondria, Chloroplast

129. Sucrose is converted into glucose and fructose by enzyme :-

(1) Maltose (2) Anylase

(3) Invertase (4) Hexokinase

130. The metabolic breakdown of carbohydrates, fatty acids and amino acids is connected through :-

(1) Acetyl–CoA

(2) Pyruvic acid

(3) PGAL

(4) α-ketoglutarate

131. Which of the following is referred as cytochrome C oxidase ?

(1) Complex IV (2) Complex III

(3) Complex II (4) Complex I

132. **Statement - I :** The complete oxidation of pyruvate by the stepwise removal of all the hydrogen atoms, leaving two molecules of CO_2.

Statement - II : The metabolic fate of pyruvate depends on the cellular need.

(1) Statement I and II both are correct.

(2) Statement I and II both are incorrect.

(3) Only Statement I is correct.

(4) Only Statement II is correct.

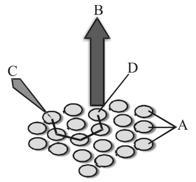
133. Find out the correct match from following table :-

	Characteristics	**C_3 plants**	**C_4 plants**
I	Primary CO_2 acceptor	RuBP	RuBP
II	Primary CO_2 fixation product during C_3 cycle	PGA	PGA
III	No. of carbons in the primary CO_2 acceptor	3	5
IV	Initial carboxylation reaction occurs	Mesophyll cells	Bundle sheath cells

(1) I, III, IV (2) II only

(3) IV only (4) II, III, IV

134. Choose the correct match for A to D:-



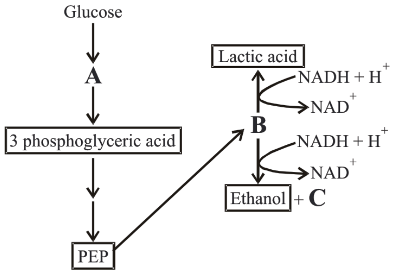
(1) A- Photons, B- Reaction centre, C- Primary acceptor, D- accessory pigments

(2) A- Antenna molecules, B-Primary acceptor , C- Photons, D-Reaction centre

(3) A-Primary acceptor, B-Photons, C-Reaction centre, D- Antenna molecules

(4) A-Antenna molecules, B- Reaction centre C-photons, D- Primary Acceptor

135.



Choose the correct option regarding labelling A to C :-

(1) A = PGAL, B = Pyruvic acid, C = CO_2

(2) A = Malic acid, B = CO_2, C = PGAL

(3) A = PGAL, B = Acetyl CoA, C = CO_2

(4) A = Malic acid, B = Pyruvic acid, C = Acetyl CoA

SECTION - B (BOTANY)

136. $2H_2A + CO_2 \xrightarrow{\text{Light}} 2A + CH_2O + H_2O$

Imagine that H_2A is H_2S in purple and green sulphur bacteria find the A in product :-

(1) Sulphur only

(2) Sulphate only

(3) Either sulphur or sulphate

(4) Oxygen

137. Electron transport system (ETS) present in inner mitochondrial membrane, in which cytochrome c is a protein which is attached to :-

(1) Outer side of inner mitochondrial membrane

(2) Inner side of inner mitochondrial membrane

(3) Outer side of outer mitochondrial membrane

(4) None of the above

138. (A) The F_1 head piece is a transmembrane protein complex which contains the site of ATP synthesis.

(B) F_0 is an integral membrane protein which forms the channel through which protons cross the outer membrane of mitochondria.

(1) Only A is correct

(2) Both A and B are correct

(3) Only B is correct

(4) Both A and B are incorrect

139. Choose the correct option :-

(1) $RQ = \dfrac{\text{Volume of } CO_2 \text{ evolved}}{\text{Volume of } O_2 \text{ consumed}}$

(2) RQ depends on the types of respiratory material.

(3) Living organisms use respiratory substance (often more than one); pure lipid or fats are never used.

(4) All of these

140. Select the correct option with respect to number of carbon (C) present in respiratory intermediates.

	PEP	Acetyl-Co-A	α-KGA	OAA
(1)	3C	2C	4C	5C
(2)	3C	2C	5C	4C
(3)	2C	3C	4C	5C
(4)	3C	3C	2C	5C

141. **Assertion :** During aerobic respiration, although the role of oxygen is limited to the terminal stage of the process. Yet, the presence of oxygen is vital.

Reason : Oxygen acts as the final hydrogen acceptor and drives the whole process of aerobic respiration by removing hydrogen from the system.

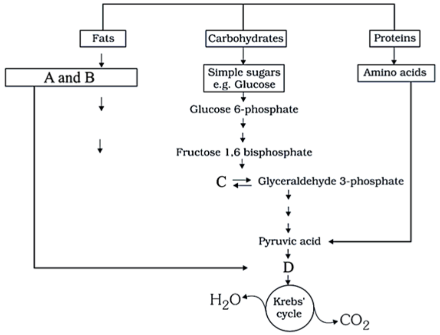
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

142. Below diagram shows the utilisation of different respiratory substrates. Identify A, B, C and D.



	A	B	C	D
(1)	Fructose-6-phosphate	Glyceraldehyde-3-phosphate	Fatty acid	Pyruvic acid
(2)	Fatty acid	Glycerol	DHAP	Acetyl-CoA
(3)	Glycerol	Fatty acid	Acetyl-CoA	DHAP
(4)	Glycolic acid	Glycerol	Pyruvic acid	Acetyl-CoA

143. Which of the following statements regarding C_3 plants is/are correct ?

(A) They have better efficiency than C_4 plants.

(B) They exhibit photorespiration

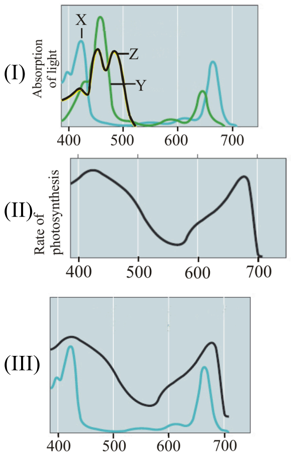
(C) They do not have PGA as primary CO_2 fixation product.

(D) Maize is an example of C_3 plant

(1) A, C & D are correct (2) B & D are correct

(3) A & C are correct (4) Only B is correct

144.



Choose the correct match :-

		Graph-I	Graph-II	Graph-III
(1)	X	Chl-a	Action spectrum of Photosynthesis	Rate of photosynthesis superimposed on absorption spectrum of chl-a
	Y	Chl-b		
	Z	Carotenoid		
(2)	X	Carotenoid	Rate of Photosynthesis superimposed on absorption spectrum of chl-a	Absorption spectrum of chl-a, chl-b and carotenoids
	Y	Chl-a		
	Z	Chl-b		
(3)	X	Carotenoid	Absorption spectrum of chl-b	Action spectrum of photosynthesis
	Y	Chl-b		
	Z	Chl-a		
(4)	X	Chl-a	Absorption spectrum of carotenoid	Absorption spectrum of chl-a, chl-b
	Y	Chl-b		
	Z	Carotenoid		

145. Read given statement carefully-

Statement-I : A 5-carbon ketose sugar i.e., Ribulose bis phosphate is primary acceptor of CO_2 in C_3–pathway.

Statement-II : Carboxylation is the fixation of CO_2 into a stable organic intermediate in C_3–cycle.

Choose the correct answer :

(1) Both Statement-I & Statement-II are correct

(2) Both Statement-I & Statement-II are incorrect

(3) Statement-I is correct but the Statement-II is incorrect.

(4) Statement-I is incorrect but the Statement-II is correct.

146. Match the column I, II and III with respect to glycolytic pathway and choose the correct option.

	Column-I (Reaction)		Column-II (Enzyme)		Column-III (Energy equivalent)
(A)	Glucose → Glucose 6-P	(I)	Dehydrogenase	(1)	ADP → ATP
(B)	Fructose 6-P → Fructose1, 6-Bisphosphate	(II)	Hexokinase	(2)	ATP → ADP
(C)	PEP → Pyruvate	(III)	Pyruvate kinase	(3)	$NAD^+ \rightarrow NADH_2$
(D)	PGAL → 1, 3–Bisphospho glycerate	(IV)	Phosphofructokinase		

(1) A-I-2, B-II-2, C-III-3, D-IV-1

(2) A-II-1, B-III-2, C-IV-2, D-II-3

(3) A-IV-1, B-III-2, C-II-3, D-I-2

(4) A-II-2, B-IV-2, C-III-1, D-I-3

147. Carotenoids

(1) Protect chlorophyll from photo oxidation

(2) Enable a wider range of wavelength of incoming light to be utilised for photosynthesis

(3) Are used for synthesis of hormone ABA

(4) All of these

148. Yeasts poison themselves to death if the concentration of alcohol reaches about :-

(1) 20%

(2) 15%

(3) 13%

(4) 10%

149. **Assertion :** R.Q. of fats is less than one.
Reason : Fats require more oxygen for oxidation.

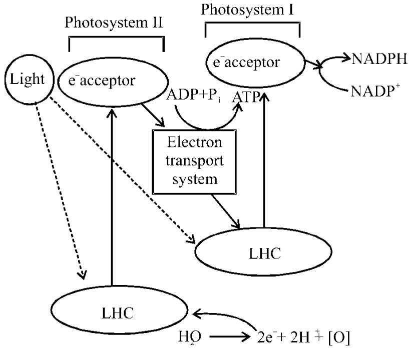
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

150.



(A) ATP synthesis performed by PS-II

(B) ATP synthesis requires only PS-I

(C) There is pumping of H^+ in ETC through F_0–F_1

(D) There is pumping of H^+ from stroma to lumen via carrier of ETC

How many statements are incorrect ?

(1) 1 (2) 2

(3) 3 (4) 4

SECTION - A (ZOOLOGY)

151. Number of chambers in the heart of cockroach are :

(1) 5 (2) 9

(3) 13 (4) 16

152. Oxygen is carried to the tissues of cockroach by which organ :

(1) Skin

(2) Trachea

(3) Plasma

(4) Respiratory pigment

153. Visual unit of compound eye in cockroach-

(1) Oceli

(2) Rhabdom

(3) Ommatidium

(4) Lens

154. Hepatic caecae of cockroaches secretes

(1) Uric acid

(2) Digestive juice

(3) Cellulose only

(4) Heparin

155. In frog, right auricle receives blood from :-

(1) Lungs

(2) Truncus arteriosus

(3) Sinus venosus

(4) Carotid artery

156. Juxta glomerular apparatus contain all the following cells, except :-

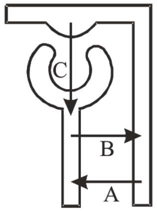
(1) Macula densa

(2) Juxta glomerular cells

(3) Podocyte cells

(4) Lacis cells

157. What does the following represent for urine formation, Identify A, B & C :-



(1) A-Secretion, B-reabsorption, C-ultrafiltration

(2) A-ultrafiltration, B-secretion, C-reabsorption

(3) A-Secretion, B-ultrafiltration, C-reabsorption

(4) A-reabsorption, B-ultrafitration, C-secretion

158. Mammals are :-

(1) Ureotelic

(2) Uricotelic

(3) Ammonotelic

(4) Ammono-ureotelic

159. If ADH level in blood is decreased :-

(1) Volume of urine increase

(2) Volume of urine decrease

(3) Volume of urine is normal

(4) Volume of urine is unaffected

160. Malpighian body is constituted by

(1) Glomerulus only

(2) Glomerulus and Bowman's capsule

(3) Glomerulus and efferent vessel

(4) Glomerulus, Bowman's capsule and efferent vessel

161. Which one of these is not a part of uriniferous tubule ?

(1) Loop of Henle

(2) Collecting duct

(3) Bowman's capsule

(4) Distal convoluted tubule

162. Total filtrate formed in 24 hours in human kidney is

(1) 1.8 litres

(2) 8.0 litres

(3) 18 litres

(4) 180 litres

163. Uric acid is the main excretory product of :-

(1) *Planaria*, Crustacea, Frog

(2) Reptiles, land snails, Insects

(3) Reptiles, Tadpole of frog, Birds

(4) Insects, Reptiles, Marine fishes

164. Ascending limb of loop of Henle is permeable for :

(1) Glucose

(2) NH_3

(3) Na^+

(4) Water

165. Which one of the following is also known as antidiuretic hormone ?

(1) Oxytocin

(2) Vasopressin

(3) Adrenaline

(4) Calcitonin

166. Which of the following statement is **false** ?

(1) ADH helps in water elimination making urine hypotonic

(2) Protein free fluid is filtered from blood plasma into the bowman's capsule

(3) Glucose is actively reabsorbed in the PCT.

(4) Henle's loop plays an important role in concentrating the urine.

167. Match the column :-

A	Diuresis	i	No urine formation
B	Anuria	ii	Blood in urine
C	Haematuria	iii	More urine formation
D	Dysuria	iv	Painful micturition

(1) A – i, B – ii, C – iii, D – iv

(2) A – iv, B – iii, C – ii, D – i

(3) A – iii, B – i, C – ii, D – iv

(4) A – iv, B – i, C – ii, D – iii

168. How many statement/s is/are false about the kidneys?

(A) The right kidney is positioned little inferiorly than the left kidney

(B) The cortex is subdivided into renal pyramids

(C) The renal artery, renal vein and ureter enter the kidney at it's hilum.

(D) The kidney is covered with a renal capsule

(1) Only one

(2) Two

(3) Three

(4) Four

169. Which statement is true regard to reabsorption?

(1) Mammals have the ability to produce concentrated urine

(2) Nearly all of the essential nutrients are reabsorbed by PCT

(3) DCT is also capable of reabsorption of HCO_3^-

(4) All the above

170. Which one of the following statements is incorrect ?

(1) The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces.

(2) Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.

(3) Glomerulus alongwith Bowman's capsule is called the renal corpuscle.

(4) Renal corpuscle, proximal convoluted tabule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney.

171. Which of the following is/are correct for RAAS ?

(A) Responsible for vasodilation.

(B) Decrease GFR.

(C) Stimulate the secretion of aldosterone.

(D) Stimulate J.G. cells to release renin.

(E) Increase glomerular blood pressure.

(1) A,B (2) A,B,C

(3) C,D,E (4) A,B,C,D

172. **Assertion :-** Patient of diabetes mellitus shows glycosuria.

Reason :- Insulin hormone is responsible for lowering blood glucose level and it is less in diabetes mellitus condition

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

173. **Assertion :-** Glomerulus is a tuft of capillaries formed from afferent arteriole.

Reason :- Afferent arteriole is a fine branch of renal artery.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

174. Match the following columns -

Column I		Column II	
A.	Ammonotelic	1	Aquatic invertebrates
B.	Ureotelic	2	Reptiles
C.	Uricotelic	3	Birds
		4	Amphibians
		5	Mammals

Choose the correct option :

	A	B	C
(1)	4, 5	3	1, 2
(2)	1, 2	3	4, 5
(3)	1	4, 5	2, 3
(4)	2, 3	1	4, 5

175. Match the Column-I with Column-II

	Column-I		Column-II
(i)	Lungs	(a)	Waxes
(ii)	Largest gland	(b)	Lactic acid
(iii)	Sweat gland	(c)	H_2O
(iv)	Sebaceous gland	(d)	Steroid hormone

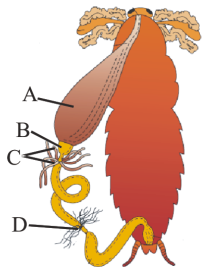
(1) i-c, ii-d, iii-b, iv-a

(2) i-a, ii-b, iii-c, iv-d

(3) i-c, ii-b, iii-a, iv-d

(4) i-d, ii-c, iii-b, iv-a

176. The given figure shows alimentary canal of cockroach. Identify the parts labelled as A to D and select the correct option.



	A	B	C	D
(1)	Gizzard	Crop	Hepatic Caeca	Malpighian tubules
(2)	Crop	Gizzard	Hepatic Caeca	Malpighian tubules
(3)	Crop	Gizzard	Malpighian tubules	Hepatic Caeca
(4)	Gizzard	Crop	Malpighian tubules	Hepatic Caeca

177. Consider the following four statements (A-D) with regards to cockroach and select the option which includes all the correct ones only.

(A) Single spermatheca is found which is opened into genital chamber.

(B) Female forms average 9-10 ootheca and each ootheca contain14-16 eggs.

(C) Ootheca is a capsule formed around the unfertilized egg.

(D) Nymph undergoes metamorphosis and changed into adult

(1) Statements A & B

(2) Statements B & C

(3) Statements B & D

(4) Statements A & C

178. Match the items given in Column I with those Column II and select the **correct** option given below:

	Column I (Function)		Column II (Part of Excretory System)
a.	Ultrafiltration	i.	Henle's loop
b.	Concentration of urine	ii.	Ureter
c.	Transport of urine	iii.	Urinary bladder
d.	Storage of urine	iv.	Malpighian corpuscle
		v.	Proximal convoluted tubule

	a	b	c	d
(1)	iv	v	ii	iii
(2)	iv	i	ii	iii
(3)	v	iv	i	ii
(4)	v	iv	i	iii

179. Which of the following is incorrect statement :-

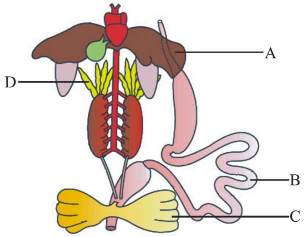
(1) On an average, 1100-1200ml of blood is filtered by the kidneys per minute

(2) Vasa-recta is absent or highly reduced in the cortical nephrons

(3) GFR in a healthy individual is approximately 125 ml/minute

(4) Human kidney is protonephric

180. Given below is a diagrammatic representation of internal organ of frog labelled A, B, C and D showing digestive system :



Identify the incorrect statement :-

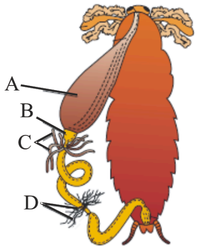
(1) A— is liver which is trilobed

(2) B— is intestine and its length is reduced in frog due to its carnivorous nature

(3) C— is urinary bladder which opens in cloaca

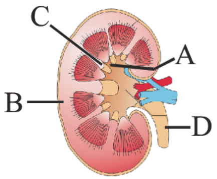
(4) D— is kidney, which is metanephric

181. In the given diagram of cockroach which one of these is correctly identified in the options given for A, B, C and D with their functions ?



		Organ	Function
(1)	A	Stomach	Secrete digestive juice
(2)	B	Gizzard	Grinding the food particles
(3)	C	Malpighian tubules	Digestion
(4)	D	Hepatic caeca	Absorption

182. Given figure is of longitudinal section of kidney. Identify the parts labelled as A to D and select the correct option :-



	A	B	C	D
(1)	Cortex	Calyx	Renal column	Ureter
(2)	Calyx	Cortex	Renal column	Ureter
(3)	Medulla	Cortex	Renal capsule	Urethra
(4)	Calyx	Cortex	Renal pelvis	Urethra

183. Match column-I with column-II and select the correct option from the codes given below :-

	Column-I		Column-II
A.	Delivers blood to glomerulus	(i)	Ascending and descending limbs
B.	Carries urine to pelvis	(ii)	Renal artery
C.	Collects filtrate from Bowman's capsule	(iii)	Collecting duct
D.	Loop of Henle	(iv)	PCT

(1) A-(ii), B-(iii), C-(iv), D-(i)

(2) A-(i), B-(iii), C-(ii), D-(iv)

(3) A-(ii), B-(iv), C-(i), D-(iii)

(4) A-(iv), B-(iii), C-(ii), D-(i)

184. Identify the correct match from the column I, II and III :-

	Column I		Column II		Column III
(1)	PCT	(a)	podocytes	(i)	small amount of urea enter into it
(2)	Inner wall of bowmans capsule	(b)	simple squamous epithelium	(ii)	conditional reabsorbtion
(3)	Thin ascending segment of loop of Henle	(c)	cuboidal epithelium with less brush border	(iii)	part of filtration membrane
(4)	DCT	(d)	cuboidal epithelium with more brush border	(iv)	maximum reabsorption of salt and electrolytes

(1) 1 – c – iv; 2 – a – iii; 3 – b – i; 4 – d – ii

(2) 1 – d – iv; 2 – a – iii; 3 – b – i; 4 – c – ii

(3) 1 – b – iv; 2 – a – iii; 3 – a – i; 4 – c – ii

(4) 1 – d – iv; 2 – a – iii; 3 – b – ii; 4 – c – i

185. Consider the following four statements (i) - (iv) and select the correct option stating which ones are true (T) and which ones are false (F).

(i) In male cockroach genital pouch or chamber lies at the hind end of abdomen bounded dorsally by 9th and 10th terga and ventrally by the 9th sternum.

(ii) In cockroach the haemolymph is composed of colourless plasma and haemocytes.

(iii) In female cockroach each ovary is formed of a group of ten ovarian tubules or ovarioles, containing a chain of developing ova.

(iv) In cockroach the nymph grows by moulting about 13 times to reach the adult form.

	(i)	(ii)	(iii)	(iv)
(1)	F	T	F	T
(2)	F	F	T	T
(3)	T	T	F	T
(4)	T	F	T	F

SECTION - B (ZOOLOGY)

186. Exoskeleton of cockroach is made up of :

(1) Cartilage (2) Cuticle

(3) Chitin (4) Amino acids

187. Mouth part of cockroach are suited for :

(1) Piercing (2) Absorbing

(3) Cutting & chewing (4) Drinking

188. Brood or genital pouch in female cockroach is formed by :-

(1) 7th 8th 9th Terga

(2) 7th 8th 9th Sterna

(3) 7th Terga 8th and 9th Sterna

(4) 7th Sterma 8th and 9th Terga

189. How many ova a mature female frog lays at a time ?

(1) 2000-3000 (2) 2500-3000

(3) 1000-2000 (4) 500-1000

190. Male frog can be distinguished from female frog by :

(1) Anal style

(2) Truncus arteriosus

(3) Amplexusory pad and vocal sacs

(4) Teeth on lower jaw

191. Bidder's canal present in :

(1) Kidney of female frog

(2) Kidney of male frog

(3) Testis in frog

(4) Ovary in frog

192. During hibernation or aestivation, frog respires mainly by :-

(1) Lungs

(2) Skin

(3) Buccopharyngeal cavity

(4) Gills

193. Amount of urea excreted per day in human is :-

(1) 25-30 gm (2) 200 ml

(3) 125 ml (4) 180 lit.

194. Excretory structure in amphioxus is :-

(1) Protonephridia (2) Nephridia

(3) Green glands (4) Kidney

195. The condition of accumulation of urea in blood is:-

(1) Glycosuria

(2) Ketonuria

(3) Uremia

(4) Haematuria

196. Deficiency of vasopressin leads to –

(1) Diabetes mellitus (2) Diabetes insipidus

(3) Goitre (4) Myxoedema

197. Kidneys are situated in -

(1) Between the last thoracic and 5th lumbar vertebra

(2) Between the last thoracic and 3rd lumbar vertebra

(3) Between the last thoracic and 2nd lumbar vertebra

(4) Between the last thoracic and 1st lumbar vertebra

198. Match the following :-

Column-I		**Column-II**	
A.	PCT	(i)	Selective secretion of H^+ and K^+ ions.
B.	DCT	(ii)	70-80 percent of electrolytes and water reabsorbed
C.	Descending limb of LOH	(iii)	Allow passage of small amount of urea.
D.	Ascending limb of LOH	(iv)	Permeable to water
E.	Collecting duct	(v)	Permeable to salts

(1) A-(i), B-(ii), C-(iii), D-(iv), E-(v)

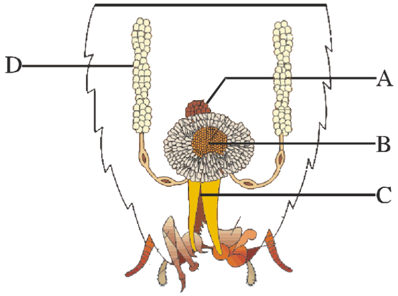
(2) A-(i), B-(iii), C-(iv), D-(ii), E-(v)

(3) A-(ii), B-(i), C-(iv), D-(v), E-(iii)

(4) A-(ii), B-(i), C-(v), D-(iv), E-(iii)

199. Study the given figure of reproductive system of male cockroach.

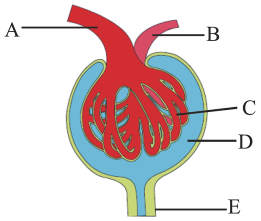
In which of the labelled parts are the sperms stored?



(1) A (2) B

(3) C (4) D

200. The part labelled as A, B, C, D and E of renal corpuscles represents :-



(1) A ⟶ Afferent Arteriole
B ⟶ Efferent Arteriole
C ⟶ Glomerulus
D ⟶ Bowmans capsule
E ⟶ DCT

(2) A ⟶ Efferent Arteriole
B ⟶ Afferent Arteriole
C ⟶ Glomerulus
E ⟶ PCT

(3) A ⟶ Afferent Arteriole
B ⟶ Efferent Arteriole
C ⟶ Glomerulus
D ⟶ Bowmans capsule
E ⟶ PCT

(4) A ⟶ Afferent Arteriole
B ⟶ Efferent Arteriole
D ⟶ Glomerulus
E ⟶ PCT

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1. Each candidate must show on demand his/her Allen ID Card to the Invigilator.
2. No candidate, without special permission of the Invigilator, would leave his/her seat.
3. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty.
4. Use of Electronic/Manual Calculator is prohibited.
5. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
6. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
7. The candidates will write the Correct Name and Form No. in the Test Booklet/Answer Sheet.

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TEST # 07
05-01-2025

SERIES / JOINT PACKAGE COURSE

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NIT TEST # 06

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t until you are asked to do so.

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is Test Booklet.

Important Instructions :

1. On the Answer Sheet, fill in the particulars on **Side-1 and Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and this Test Booklet contains **200** questions. Each question carries **4** marks. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. In this Test Paper, each subject will consist of **two sections. Section A** will consist of 35 questions (all questions are mandatory) and **Section B** will have 15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. The candidates are allowed to take away this Test Booklet with them.**
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is **not** permissible on the Answer Sheet.

ले में, अंग्रेजी संस्करण को अंतिम माना जाएगा।
uestion, English version shall be treated as final.

निरीक्षक के हस्ताक्षर :
Invigilator's Signature :

romagnetic Induction, Alternating current, Electromagnetic

SECTION - A (PHYSICS)

1. A thin hollow copper pipe carries direct current, then which is incorrect ?

(1) Magnetic filed inside the pipe is zero.

(2) Magnetic field is not zero outside the pipe.

(3) Electric field on the surface of pipe is not zero.

(4) Electric field outside the pipe is not zero.

2. Two long straight parallel wires, 10 cm apart, carry currents of 5 A each in opposite directions. Then the magnetic field at a point midway between them is :-

(1) Zero (2) 2×10^{-4} T

(3) 4×10^{-5} T (4) 5×10^{-4} T

3. The length of solenoid is 0.1 m, its diameter is very small and it is made of a wire in two layers. The number of turns in inner layer is 50 and that of outer layer is 40. The strength of current flowing in each of two layers in opposite direction is 3A. Calculate magnetic field at the middle of the solenoid :-

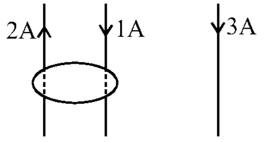
(1) $12\pi \times 10^{-5}$ T

(2) $6\pi \times 10^{-5}$ T

(3) $12\pi \times 10^{-4}$ T

(4) $6\pi \times 10^{-3}$ T

4. Two wires with currents 2 A & 1 A are enclosed in circular loop. Another wire with current 3 A is situated outside the loop as shown. The $\oint \vec{B} \cdot \vec{d\ell}$ around the loop is :-



(1) μ_0 (2) $3\mu_0$

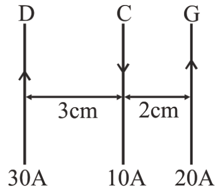
(3) $6\mu_0$ (4) $2\mu_0$

5. A proton and an α-particle enter a uniform magnetic field perpendicularly with the same speed. If proton takes 25 μ sec to make 5 revolutions, then the periodic time for the α-particle would be :-

(1) 50 μ sec (2) 25 μ sec

(3) 10 μ sec (4) 5 μ sec

6. Three long straight parallel wires, carrying current, are arranged as shown in figure. The force experienced by 25 cm length of wire C is :



(1) 10^{-3} N (2) 2.5×10^{-3} N

(3) zero (4) 1.5×10^{-3} N

7. A solenoid of 1200 turns is wound uniformly in a single layer on a glass tube 2 m long and 0.2 m in diameter. The magnetic intensity at the center of the solenoid, when a current of 2 A flows through it, is :

(1) 2.4×10^{3} A m^{-1} (2) 1.2×10^{3} A m^{-1}

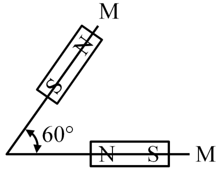
(3) 1 A m^{-1} (4) 2.4×10^{-3} A m^{-1}

8. The acceleration of a charge at certain moment in magnetic field $\vec{B} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ is $\vec{a} = x\hat{i} + \hat{j} - \hat{k}$. The value of x is :-

(1) 0.5 (2) 1

(3) 2.5 (4) 1.5

9. Magnetic moment of each bar magnet is M. Find resultant magnetic moment of following :-



(1) Zero (2) 2 M

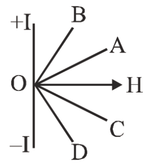
(3) $\sqrt{3}$ M (4) M

10. A paramagnetic substance of susceptibility 3×10^{-4} is placed in a magnetic intensity of 4×10^{-4} Am^{-1}. Then the intensity of magnetization (in the units of Am^{-1}) is :

(1) 1.33×10^{8} (2) 0.75×10^{-8}

(3) 12×10^{-8} (4) 14×10^{-8}

11. The variation of the intensity of magnetisation (I) with respect to the magnetising field (H) in a diamagnetic substance is described by the graph :-



(1) OD (2) OC (3) OB (4) OA

12. There are four light-weight rod samples A, B, C and D separately suspended by threads. A bar magnet is slowly brought near each sample and the following observations are noted :-

(i) A is feebly repelled

(ii) B is feebly attracted

(iii) C is strongly attracted

(iv) D remains unaffected

Which one of the following is true ?

(1) B is of a paramagnetic material

(2) C is of a diamagnetic material

(3) D is of a ferromagnetic material

(4) A is of a non-magnetic material

13. **Assertion (A) :-** The kinetic energy of charged particle moving in a uniform magnetic field does not change.

Reason (R) :- Work done by magnetic field on the charge is zero.

(1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(2) (A) is correct but (R) is not correct

(3) (A) is incorrect but (R) is correct

(4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

14. The magnetic flux linked with a coil at any instant t is given by the equation :

$\phi = 5t^3 - 100t + 300$

The magnitude of emf induced in the coil after 3s is :

(1) 10V (2) 20V

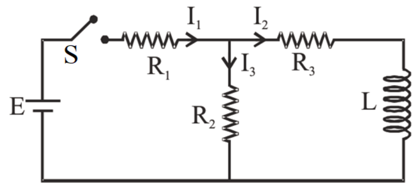
(3) 35V (4) 70V

15. A coil of area 0.1 m^2 has 500 turns. After placing the coil in a magnetic field of strength 4×10^{-4} Wb/m^2, it is rotated through 90º in 0.1 second. The average e.m.f. induced in the coil is :

(1) 0.2 volt (2) 0.1 volt

(3) 0.05 volt (4) 0.012 volt

16. In the circuit shown in the following figure, E = 10V, R_1 = 2 ohm, R_2 = 3 ohm and R_3 = 6 ohm and L = 5 henry. The current I_1 after sometime of pressing the switch S is :-



(1) (10/4) amp

(2) (10/5) amp

(3) (10/12) amp

(4) (10/6) amp

17. If a coil of 40 truns and area 4.0 cm^2 is suddenly removed from a magnetic field, it is observed that a charge of 2.0×10^{-4} C flows into the coil. If the resistance of the coil is 80 Ω, then magnetic flux density (in Wbm^{-2}) is

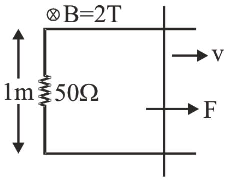
(1) 0.5 (2) 1.0

(3) 1.5 (4) 2.0

18. The dimensional formula of self inductance (L) are -

(1) $[MLT^{-2}A^{2}]$ (2) $[M^{2}L^{2}T^{-2}A^{2}]$

(3) $[ML^{2}T^{-2}A^{-2}]$ (4) $[M^{2}LT^{-2}A^{-2}]$

19. 

A wire is sliding on two parallel conducting rails placed at a separation of 1m as shown in figure. Magnetic field 2T exists in a direction perpendicular to rails. What force is necessary to keep the wire moving with a constant velocity of 1 cm/sec?

(1) 0.08×10^{-3} N (2) 8×10^{-6} N

(3) 4×10^{-6} N (4) 8×10^{-4} N

20. A transformer with efficiency 80% works at 4 kW and 100 V. If the secondary voltage is 200 V, then the primary and secondary currents are respectively

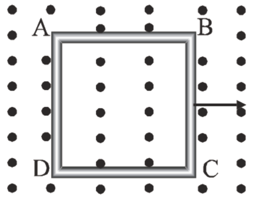
(1) 40 A, 16 A (2) 16 A, 40 A

(3) 20 A, 40 A (4) 40 A, 20 A

21. Two coils have a mutual inductance 0.05 H. The current changes in first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 8A$ and $\omega = 100\pi$ rad/s. The maximum value of emf (in volts) in second coil is :-

(1) 10π (2) 20π (3) 30π (4) 40π

22. A metallic square loop ABCD is moving in its own plane with velocity v in a uniform magnetic field perpendicular to its plane as shown in the figure. An electric field is induced :-



(1) In AD, but not in BC

(2) In BC, but not in AD

(3) Neither in AD nor in BC

(4) In both AD and BC

23. Two identical cycle wheels (geometrically) have different number of spokes connected from centre to rim and placed in a uniform magnetic field and both are rotating with the uniform angular velocity ω. One is having 20 spokes and other having only 10 (the rim and the spokes are resistance less). One resistance of value R is connected between centre and rim. The current in R will be :-

(1) double in first wheel than in the second wheel.

(2) four times in first wheel than in the second wheel.

(3) will be double in second wheel than that of the first wheel.

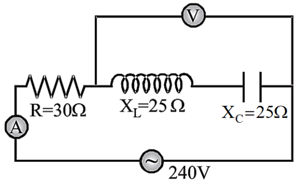
(4) will be equal in both these wheels.

24. In an AC generator, a coil with N turns, all of the same area A and total resistance R, rotates with frequency ω in a magnetic field B. The maximum value of emf generated in the coil is

(1) NABω (2) NABRω

(3) NAB (4) NABR

25. In the circuit shown in figure, neglecting source resistance, the voltmeter and ammeter reading will respectively be :-



(1) 0V, 3A (2) 150V, 3A

(3) 150V, 6A (4) 0V, 8A

26. The values of L, C and R for a circuit are 1 H, 9 F and 3Ω. What is the quality factor for the circuit at resonance ?

(1) 1 (2) 9

(3) $\frac{1}{9}$ (4) $\frac{1}{3}$

27. At resonance in a series LCR circuit, which of the following statements is true ?

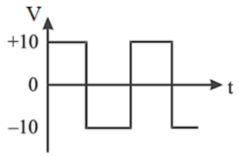
(1) Current in the circuit is maximum and phase difference between E and I is $\pi/2$

(2) Current in the circuit is maximum and phase difference between E and I is zero

(3) Voltage is maximum and phase difference between E and I is $\pi/2$

(4) Current is minimum and phase difference between E and I is zero

28. The r.m.s. voltage of the wave form shown is :



(1) 10 V (2) 7 V

(3) 6.37 V (4) None of these

29. The current and voltage function in an AC circuit are:

$$I = 100 \sin 100t \text{ mA}$$

$$V = 100 \sin\left(100t + \frac{\pi}{3}\right) \text{ volt}$$

the power dissipated in the circuit is

(1) 10 W (2) 2.5 W (3) 5 W (4) 5 kW

30. If alternating current of 60 Hz frequency is flowing through inductance of L=1 mH and drop in V_L is 0.6 V, then alternating current will be :-

(1) $\frac{1}{\pi}$ A (2) $\frac{5}{\pi}$ A

(3) $\frac{50}{\pi}$ A (4) $\frac{20}{\pi}$ A

31. The sun delivers 10^4 W/m^2 of electromagnetic flux to the earth's surface. The total power that is incident on a roof of dimensions 10×10 m^2 will be :-

(1) 10^4 W (2) 10^5 W

(3) 10^6 W (4) 10^7 W

32. The electromagnetic wave having the shortest wavelength is :-

(1) X-rays (2) microwaves

(3) infrared rays (4) γ-rays

33. The electric field associated with an electromagnetic wave in vacum is given by $\vec{E} = 40\cos(kz - 6 \times 10^8 t)\hat{i}$, where E, z and t are in volt per meter, meter and second respectively. The value of wave vector k is :-

(1) 2 m^{-1} (2) 0.5 m^{-1}

(3) 6 m^{-1} (4) 3 m^{-1}

34. If electric field in a non-magnetic medium for E.M. wave is given by $\vec{E} = 1200 \sin\left(10^8 t + \frac{Z}{3}\right)\hat{j}$ V/m, then $\vec{B}$ is :-

(1) $4 \times 10^{-6} \sin(10^8 t + \frac{Z}{3})\hat{i}$

(2) $2 \times 10^{-6} \sin(10^8 t + \frac{Z}{3})\hat{i}$

(3) $5 \times 10^{-7} \sin(10^8 t + \frac{Z}{3})\hat{j}$

(4) $2 \times 10^{-6} \sin(10^8 t + \frac{Z}{3})\hat{j}$

35. The charge of a parallel plate capacitor is varying as $q = q_0 \sin \omega t$. Then find the magnitude of displacement current through the capacitor. (Plate Area = A, seperation of plates = d)

(1) $q_0 \cos(\omega t)$ (2) $q_0\omega \sin \omega t$

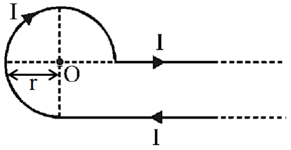
(3) $q_0\omega \cos \omega t$ (4) $\frac{q_0 A\omega}{d} \cos\omega t$

SECTION - B (PHYSICS)

36. At very close point on the axis of a current carrying circular coil (x <<< R) of radius 'R', the value of magnetic field decreases by a fraction of 5% with respect to centre value. The position 'x' of the point from the centre of the coil is :-

(1) $\frac{R}{\sqrt{10}}$ (2) $\frac{R}{\sqrt{30}}$ (3) $\frac{R}{\sqrt{50}}$ (4) $\frac{R}{\sqrt{150}}$

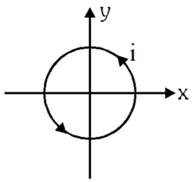
37. Current 'I' is flowing in a conductor shaped as shown in the figure. The radius of the curves part is r and the length of straight portion is very large. The value of the magnetic field at the centre O will be :-



(1) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}+1\right)$ (2) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}-1\right)$

(3) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+1\right)$ (4) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+2\right)$

38. Current i = 2.5 A flows along the circle $x^2 + y^2 = 9$ cm^2 (here x & y are in cm) as shown. Magnetic field at point (0, 0, 4 cm) is



(1) $(36\pi \times 10^{-7}\text{T})\,\hat{k}$

(2) $(36\pi \times 10^{-7}\text{T})\,(-\hat{k})$

(3) $\left(\frac{9\pi}{5} \times 10^{-7}\text{T}\right)\hat{k}$

(4) $\left(\frac{9\pi}{5} \times 10^{-7}\text{T}\right)(-\hat{k})$

39. H^+, He^+ and O^{++} are projected in uniform transverse magnetic field with equal accelerating potential, then ratio of their radii are respectively (if their masses are 1 a.m.u., 4 a.m.u. and 16 a.m.u. respectively) :-

(1) $1 : \sqrt{2} : 2\sqrt{2}$ (2) $1 : \sqrt{2} : \sqrt{2}$

(3) $1 : 2 : 2\sqrt{2}$ (4) $\sqrt{2} : 2 : 1$

40. A charged particle enters in a uniform magnetic field with certain velocity at an angle of 45° with the magnetic field. The pitch of the helical path of particle is P, then the radius of helix will be :

(1) $\frac{P}{\sqrt{2}\pi}$ (2) $\sqrt{2}P$ (3) $\frac{P}{2\pi}$ (4) $\frac{\sqrt{2}P}{\pi}$

41. **Assertion :-** Net force on a current carrying loop in a uniform magnetic field must be zero.
Reason :- Force on a current carrying small element of wire of length $d\vec{\ell}$ placed in magnetic field $\vec{B}$ is given by $\vec{dF} = i\vec{d\ell} \times \vec{B}$

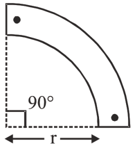
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

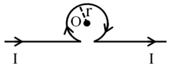
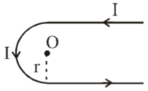
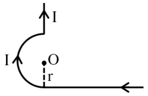
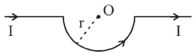
42. A bar magnet of length ' ℓ ' and magnetic dipole moment 'M' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be



(1) $\frac{\sqrt{2}M}{\pi}$ (2) M

(3) $\frac{3}{\pi}$ M (4) $2\sqrt{2}\frac{M}{\pi}$

43. Match List I with List II

	List – I (Current configuration)		List – II (Magnetic field at point O)
A		I	$B_0 = \frac{\mu_0 I}{4\pi r}[\pi + 2]$
B		II	$B_0 = \frac{\mu_0}{4}\frac{I}{r}$
C		III	$B_0 = \frac{\mu_0 I}{2\pi r}[\pi - 1]$
D		IV	$B_0 = \frac{\mu_0 I}{4\pi r}[\pi + 1]$

Choose the correct answer from the option given below:

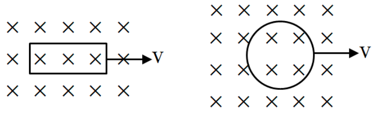
(1) A-III, B-IV, C-I, D-II

(2) A-I, B-III, C-IV, D-II

(3) A-III, B-I, C-IV, D-II

(4) A-II, B-I, C-IV, D-III

44. A rectangular loop and a circular loop are moving out of a uniform magnetic field region in the given figure to a field free region with a constant velocity v. In which loop do you expect the induced emf to be constant during the passage out of the field region?



(1) Rectangular loop (2) Circular loop

(3) Both (1) and (2) (4) Nither (1) nor (2)

45. An ideal choke draws a current of 8 A when connected to an AC supply of 100 V, 50 Hz. A pure resistor draws a current of 10 A when connected to the same source. The ideal choke and the resistor are connected in series and then connected to the AC source of 150 V, 40 Hz. The current in the circuit becomes :-

(1) $\frac{15}{\sqrt{2}}$A (2) 8 A (3) 18 A (4) 10 A

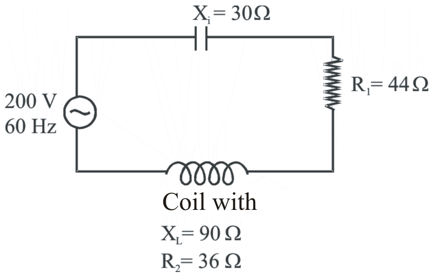
46. In a series LCR circuit voltage across resistor, inductor and capacitor are 1V, 3V and 2V respectively. At the instant t, when the source voltage is given by :

$V=V_0 \cos \omega t$, the current in the circuit will be :

(1) $I=I_0 \cos\left(\omega t+\frac{\pi}{4}\right)$ (2) $I=I_0 \cos\left(\omega t-\frac{\pi}{4}\right)$

(3) $I=I_0 \cos\left(\omega t+\frac{\pi}{3}\right)$ (4) $I=I_0 \cos\left(\omega t-\frac{\pi}{3}\right)$

47. As given in the figure, a series circuit connected across a 200 V, 60 Hz line consists of a capacitor of capacitive reactance 30 Ω, a non-inductive resistor of 44 Ω, and a coil of inductive reactance 90Ω and resistance 36Ω. The power dissipated in the coil is



(1) 320 W (2) 176 W (3) 144 W (4) 0 W

48. ***Assertion (A)*** :- In series L-C-R circuit, voltage will lead the current function for frequency greater than the resonance frequency.
Reason (R) :- At resonance frequency, phase difference between current function and voltage function is zero.

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

(2) **(A)** is correct but **(R)** is not correct

(3) **(A)** is incorrect but **(R)** is correct

(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

49. The relation between an A.C. voltage source and time in SI units is :

V = 240 sin 100 πt cos 100 πt volt, then value of peak voltage and frequency will be respectively :–

(1) 120 volt and 100 Hz

(2) $\frac{120}{\sqrt{2}}$ volt and 100 Hz

(3) 60 volt and 200 Hz

(4) 60 volt and 100 Hz

50. A flood light is covered with a filter that transmits red light. The electric field of the emerging beam is represented by a sinusoidal plane wave

$E_x = 36 \sin(1.20 \times 10^7 z - 3.6 \times 10^{15} t)$ V/m. The average intensity of the beam will be :-

(1) 0.86 W/m^2

(2) 1.72 W/m^2

(3) 3.44 W/m^2

(4) 6.88 W/m^2

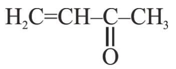
SECTION - A (CHEMISTRY)

51. In which compound all 'C' are in sp^2 hybridization:

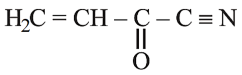
(1) $CH_3-CH_2-CH_3$

(2) $H_2C=CH-CHO$

(3) CH_3-CH_2-CN

(4) 
$H_2C=CH-\underset{\underset{O}{\|}}{C}-CH_3$

52. The no. of σ and π bonds are present in given compound.


$H_2C=CH-\underset{\underset{O}{\|}}{C}-C\equiv N$

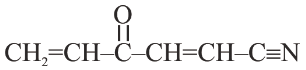
(1) 8 σ and 4 π

(2) 10 σ and 5 π

(3) 8 σ and 3 π

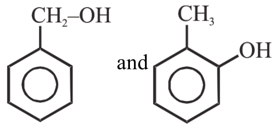
(4) 9 σ and 4 π

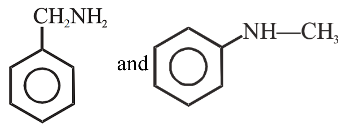
53. Find out the number of olefinic bonds in given compound :-

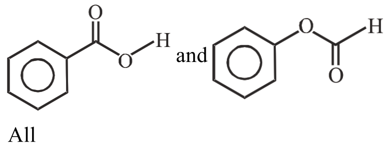

$CH_2=CH-\overset{\overset{O}{\|}}{C}-CH=CH-C\equiv N$

(1) 1 (2) 2 (3) 3 (4) 4

54. Which pair of compounds does not represent same homologous series ?

(1) 

(2) 

(3) 

(4) All

55. Match the list-I and list-II and select the correct answer :-

List - I		List - II	
(a)	C_nH_{2n}	(p)	Alcohol, ether
(b)	C_nH_{2n-2}	(q)	Alkene, cycloalkane
(c)	$C_nH_{2n+2}O$	(r)	Aldehyde, Ketones
(d)	$C_nH_{2n}O$	(s)	Alkynes, Alkadiene

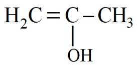
(1) (a - p), (b - q), (c - r), (d - s)

(2) (a - s), (b - r), (c - q), (d - p)

(3) (a - q), (b - s), (c - p), (d - r)

(4) (a - r), (b - p), (c - s), (d - q)

56. Which of the following structure represents vinyl carbinol :-

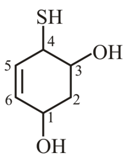
(1) 
$H_2C=\underset{\underset{OH}{|}}{C}-CH_3$

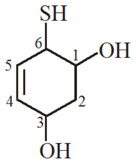
(2) $H_2C=CH-OH$

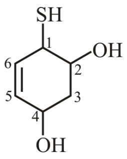
(3) $H_3C-CH=CH-OH$

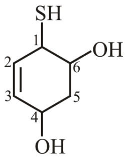
(4) $HO-CH_2-CH=CH_2$

57. Select the structure with correct numbering for the IUPAC name of the given compound?

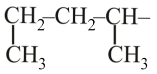
(1) 

(2) 

(3) 

(4) 

58. The IUPAC name of following Radical


$\underset{\underset{CH_3}{|}}{CH_2}-CH_2-\underset{\underset{CH_3}{|}}{CH}-$

(1) 1,2-Dimethyl propyl

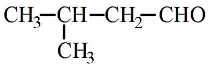
(2) 1-Methyl butyl

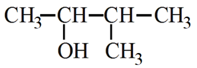
(3) 1-propyl ethyl

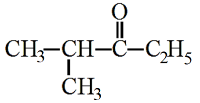
(4) 1-Methyl butane

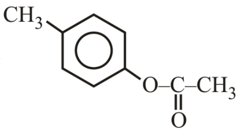
59. Which of the following compounds is wrongly named?

(1) $CH_3-CH_2-CH_2-COOCH_2CH_3$ ethyl butanoate

(2) 
$CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CHO$ 3-Methyl butanal

(3) 
$CH_3-\underset{\underset{OH}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-CH_3$ 2-Methyl-3-butanol

(4) 
$CH_3-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-C_2H_5$ 2-Methyl-3-pentanone

60. IUPAC name of  is :-

(1) 1–acetoxy–4–methyl benzene

(2) 4–methyl phenyl ethanoate

(3) 1–ethanoyloxy–4–methyl benzene

(4) O–Tollyl ethanoate

61. n-Butyl alcohol and isobutyl alcohol are :

(1) Positional isomer (2) Chain isomer

(3) Identical (4) Not isomer

62. Compounds with $C_4H_{11}N$ as molecular formula can exhibit :-

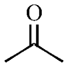
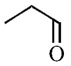
(1) Position isomerism

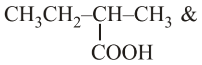
(2) Metamerism

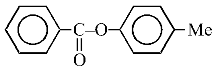
(3) Functional isomerism

(4) All the three

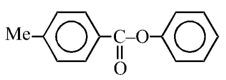
63. Identify correct matched ?

(1)  &  - Functional isomers

(2) 
$CH_3CH_2-\underset{\underset{COOH}{|}}{CH}-CH_3$ &
$CH_3-CH_2-CH_2-CH_2-COOH$ - Chain-isomers

(3) 

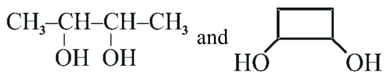
&

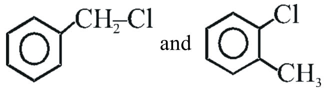


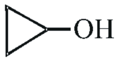
Metamers

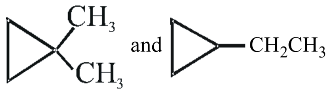
(4) All

64. Which of the following pair of compound is a ring-chain isomers :-

(1) 

(2) 

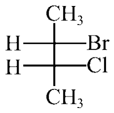
(3) $CH_2=CH-CH_2-OH$ and 

(4) 

65. The minimum number of carbon atoms present in an organic compound to be able to show position isomerism is :-

(1) 3 (2) 4

(3) 2 (4) 5

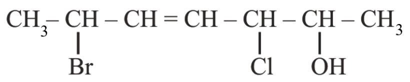
66. 

has the configuration :-

(1) (2S, 3R) (2) (2R, 3S)

(3) (2R, 3R) (4) (2S, 3S)

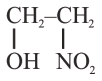
67. Find the number of stereo-isomers in the compound :

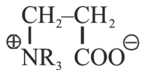

$CH_3-\underset{\underset{Br}{|}}{CH}-CH=CH-\underset{\underset{Cl}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-CH_3$

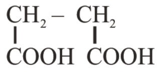
(1) 16 (2) 8

(3) 10 (4) 12

68. In which of the following compound Gauche conformation is more stable than anti (staggered) conformation:-

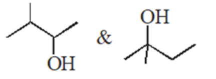
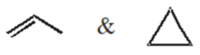
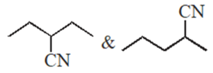
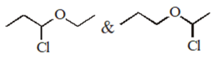
(1) 
$\underset{\underset{OH}{|}}{CH_2}-\underset{\underset{NO_2}{|}}{CH_2}$

(2) 
$\underset{\underset{\overset{\oplus}{N}R_3}{|}}{CH_2}-\underset{\underset{COO^{\ominus}}{|}}{CH_2}$

(3) 
$\underset{\underset{COOH}{|}}{CH_2}-\underset{\underset{COOH}{|}}{CH_2}$

(4) All of the above

69.

	Column-I (Compounds)		Column-II (Isomers)
(A)		(P)	Metamer
(B)		(Q)	Chain Isomer
(C)		(R)	Positional Isomer
(D)		(S)	Ring-chain Isomer

Correct match is :-

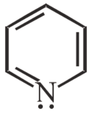
(1) A-P, B-S, C-R, D-Q

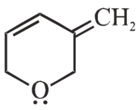
(2) A-R, B-S, C-Q, D-P

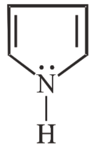
(3) A-Q, B-S, C-P, D-R

(4) A-R, B-Q, C-P, D-S

70. In which of the following lone-pair is involved in resonance :-

(I) 

(II) 

(III) 

(IV) $CH_2=CH-\ddot{O}-CH_3$

(1) I, III

(2) II, IV

(3) III, IV

(4) I, II

71. Identify the correct set of aprotic solvent :-

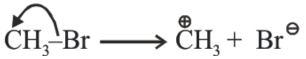
(1) Water, DMSO

(2) DMSO, Acetone

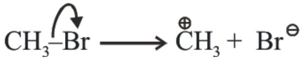
(3) Ethanol, Acetone

(4) Diethyl ether, methyl amine

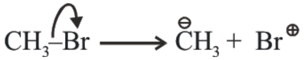
72. Covalent bond can undergo fission in two different ways. The correct representation involving a heterolytic fission of CH_3-Br is :-

(1) 

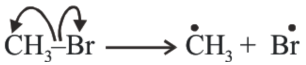
$CH_3-Br \longrightarrow \overset{\oplus}{C}H_3 + Br^{\ominus}$

(2) 

$CH_3-Br \longrightarrow \overset{\oplus}{C}H_3 + Br^{\ominus}$

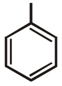
(3) 

$CH_3-Br \longrightarrow \overset{\ominus}{C}H_3 + Br^{\oplus}$

(4) 

$CH_3-Br \longrightarrow \dot{C}H_3 + \dot{Br}$

73. Correct order of –I effect is :-

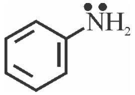
(1)  $> -NH_2 > -CH=CH_2$

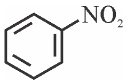
(2) $-Cl > -Br > -OH > -OR$

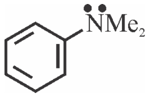
(3) $-\overset{\oplus}{N}H_3 > -CN > -F$

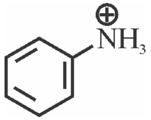
(4) $-C\equiv CH > -CH=CH_2 > -NH_2$

74. In which species C—N bond length is the maximum ?

(1) 

(2) 

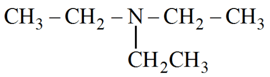
(3) 

(4) 

75. In following correct order of basic strength ?

[A] $CH_3-CH_2-NH_2$

[B] $CH_3-CH_2-NH-CH_2-CH_3$

[C] 

$CH_3-CH_2-\underset{\displaystyle CH_2CH_3}{\underset{|}{N}}-CH_2-CH_3$

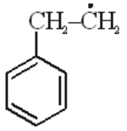
(1) A > B > C

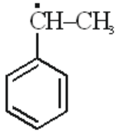
(2) C > B > A

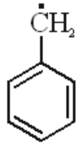
(3) B > C > A

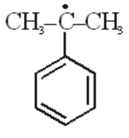
(4) B > A > C

76. The most stable free radical among the following is?

(1) 

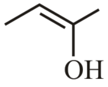
(2) 

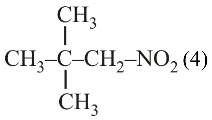
(3) 

(4) 

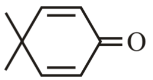
77. Which can not show tautomerism ?

(1) $H-C\equiv N$

(2) 

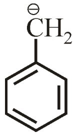
(3) 

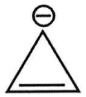
$CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-CH_2-NO_2$

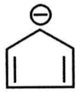
(4) 

78. Which of the following is least stable carbanion ?

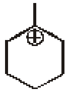
(1) $H_2C=CH-\overset{\ominus}{C}H_2$

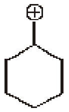
(2) 

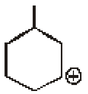
(3) 

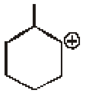
(4) 

79. Stability order of given carbocations is : -

I. 

II. 

III. 

IV. 

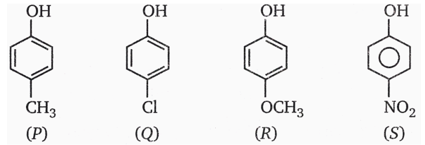
(1) I > II > III > IV

(2) I > III > IV > II

(3) I > IV > III > II

(4) I > II > IV > III

80. The decreasing order of acidity of following phenol derivatives is :



(1) R > P > Q > S

(2) P > R > Q > S

(3) R > Q > P > S

(4) S > Q > P > R

81. Correct order of stability of carbocation :-

$H_3C-\overset{\oplus}{C}H-CH_3$ (I)

$H_3C-\overset{\oplus}{C}H-OCH_3$ (II)

$H_3C-\overset{\oplus}{C}H-CH_2-OCH_3$ (III)

(1) III > I > II

(2) II > I > III

(3) II > III > I

(4) I > II > III

82. Select the incorrect statement:-

(1) Complete transfer of $\bar{e}$ of C – H σ bond towards π bond or positive charge or free electron is called as H-effect

(2) H-effect and inductive effect are permanent effect

(3) Partial displacement of σ(sigma) electron is inductive effect

(4) Electromeric effect is permanent effect

83. In Lassaigne's test the organic compound is fused with Na followed by extraction with distilled water. Which of the following is not the product of this fusion reaction?

(1) NaX

(2) NaCN

(3) NaNC

(4) Na_2S

84. 0.15 g of an organic compound gave 0.12 g of AgBr by carius method. The percentage of bromine in the compound is :- (Atomic mass of Ag = 108 and Br = 80)

(1) 43

(2) 54

(3) 34

(4) 66

85. The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is :

(1) $Na_4[Fe(CN)_5(NOS)]$

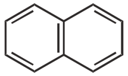
(2) $Na_3[Fe(CN)_6]$

(3) $Fe(CN)_3$

(4) $Fe_4[Fe(CN)_6]_3$

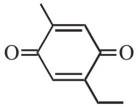
SECTION - B (CHEMISTRY)

86. No. of 2° carbon are present in given compound:-



(1) 6 (2) 10 (3) 8 (4) 2

87. The correct IUPAC name of the given compound



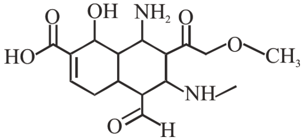
(1) 5-Ethyl-2-methylcyclohex-2, 5-diene-1, 4-dione

(2) 2-Ethyl-5-methylcyclohexa-2, 5-diene-1, 4-dione

(3) 2-Ethyl-5-methylhex-2, 5-diene-1, 4-dione

(4) 2-Ethyl-5-ethyl cyclohexa-2, 5-diene-1, 4-dione

88. How many functional groups are present in following compound?



(1) 7 (2) 6 (3) 8 (4) 9

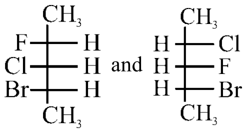
89. What should be the correct IUPAC name for diethylbromomethane :-

(1) 1-bromo-2-ethyl propane

(2) 1-bromo-2-ethyl-2-methyl ethane

(3) 1-bromo-2-ethyl butane

(4) 3-bromopentane

90.  relation is :

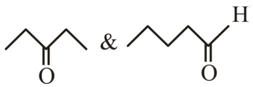
(1) Diastereomer

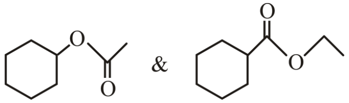
(2) Enantiomer

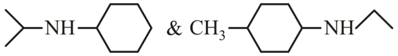
(3) Identical

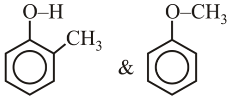
(4) Structural isomer

91. Which of the following is a pair of metamers :-

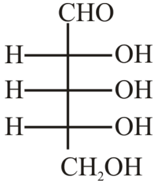
(1) 

(2) 

(3) 

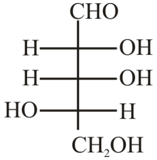
(4) 

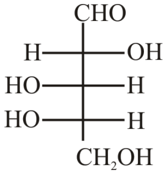
92. If given fischer projection is D-form of ribose

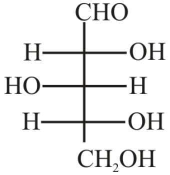


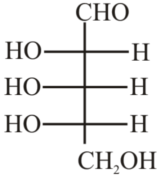
(D-ribose)

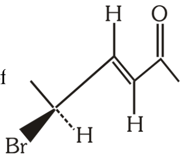
then what will be its L-form :-

(1) 

(2) 

(3) 

(4) 

93. The IUPAC name (including the stereochemical rotation for the chiral carbon) of  is –

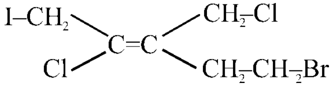
(1) (S)–2–bromo–(Z)–hex–3–en–4–one

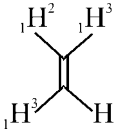
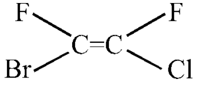
(2) (R)–2–bromo–(E)–hex–3–en–4–one

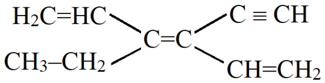
(3) (R)–5–bromo–(Z)–hex–3–en–2–one

(4) (S)–5–bromo–(E)–hex–3–en–2–one

94. How many compounds has Z-configuration :-

(i) 

(ii)  (iii) 

(iv) 

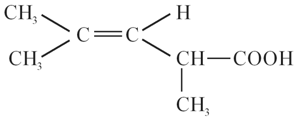
(1) Two

(2) Three

(3) One

(4) Four

95. **Statement-I :** Anisole and cresol are functional isomer

Statement-II :  show both geometrical and optical isomerism.

(1) Both Statement-I and Statement-II are correct

(2) Both Statement-I and Statement-II are incorrect

(3) Statement-I is correct but Statement-II is incorrect

(4) Statement-I is incorrect but Statement-II is correct

96. **Statement-I :-** Carbinol is the first member of aliphatic alcohols.

Statement-II :- Ethanoic anhydride is the first member of carboxylic acid anhydrides.

(1) Both Statement-I and Statement-II are incorrect.

(2) Statement-I is correct but Statement-II is incorrect.

(3) Statement-I is incorrect but Statement-II is correct.

(4) Both Statement-I and Statement-II are correct.

97. Which of the following statement is not correct for a nucleophile?

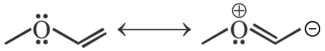
(1) Nucleophiles attack at Low e^- density sites

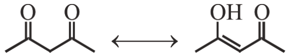
(2) Nucleophiles are not electron seeking

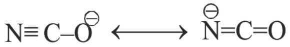
(3) Nucleophile is a Lewis acid

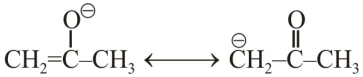
(4) Ammonia is a nucleophile

98. Which are not the pair of resonating structure ?

(1) 

(2) 

(3) 

(4) 

99. In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 g of sample neutralized 10 mL of 1 M H_2SO_4. The percentage of nitrogen in the soil is :

(1) 37.33 (2) 45.33

(3) 35.33 (4) 43.33

100. The best and latest technique for purification and separation of organic compound's is :-

(1) Crystallisation (2) Distillation

(3) Sublimation (4) Chromatography

SECTION - A (BOTANY)

101. Choose the incorrectly matched pair :-

(1) Proto-cooperation → Obligatory relationship

(2) Mutualism → Lichens

(3) Predation → Conduit of energy

(4) Amensalism → Negative interaction

102. Select the **correct** statements :-

(1) Female anapheles mosquito is a parasite

(2) Scavengers kill and eat the host

(3) Protoco-operation is a non-obligatory process.

(4) Bacteria is an example of hyper parasite

103. Vertical stratification not leads to:-

(a) increase in number of species

(b) decrease in number of species

(c) efficient use of resources of a habitat by different type of plants

(d) multistory forest formation

(1) c (2) b

(3) acd (4) bc

104. Which of the following is a famous cause of biodiversity loss ?

(1) Predation

(2) Commensalism

(3) Faculative association of species

(4) Obligate interaction of species

105. Tight one to one relationship between plant & pollinator is found in :-

(1) Fig & wasp

(2) Yucca & moth

(3) Amorphophallus & pollinators

(4) All of the above

106. The level of competition between the sps. depends on :-

(1) Limited availability of Resources

(2) High population density

(3) Common interest between the organisms

(4) All of these

107. Which statement is/are correct ?

(a) Ecology is a subject which studies the interaction among organism and between the organisms with its physical (abiotic) environment.

(b) Ecology is a subject which studies the interaction between the organism with its physical (abiotic) environment only.

(c) Ecology is a subject which studies the interaction between the organism with its biotic environment only.

(d) Ecology is a subject which studies the interaction between organisms and its biotic and physical (abiotic) environment.

(1) Only d are correct

(2) Only a are correct

(3) a and d are correct

(4) a, b, c, d are correct

108. Choose the correct option for ecosystem no. (i), (ii), (iii), (iv) ?

(i)

A	A	B
A	A	C

(ii)

A	B	C
A	B	C

(iii)

A	x	1
A	x	1

(iv)

A	A	1
A	x	1

where A, B, C are Birds, x is a mammalian species and 1 is a plant species :-

(1) (iv) is more diverse among all of these

(2) (i) is more diverse than (ii)

(3) (ii) and (iii) show same evenness

(4) (ii) and (iii) are taxonomically same diverse

109. Which one of the following is most appropriately defined ?

(1) Amensalism is a relationship in which one species is benefited where as the other is unaffected.

(2) Predator is an organism that catches and kills & eat other organism for food.

(3) Parasite is an organism which always lives inside the body of other organism and may kill it.

(4) Host is an organism which provides food to another organism.

110. Which one is correct ?

(a) Inter specific competition – Maintain species diversity

(b) Intra specific competition – Maintain equilibrium between species

(c) Intra specific competition – Maintain equilibrium in population

(d) Inter specific competition – Induced diversity loss

(1) a, b (2) a, c

(3) b, c (4) b, d

111. Which of the following is not entirely true facts?

(1) Competition occurs when closely related species compete for the same resources that are limiting.

(2) Totally unrelated species could compete for the same resources.

(3) Resources need to be limiting for competition to occur, In interference competition, the feeding efficiency of one species might be reduced due to the interfering and inhibitory presence of the other species even if resource are plenty.

(4) A complex interplay of inter specific inter action and environmental variability characterizes community structure.

112. You never see cattle or goats browsing on weed *Calotropis*, why?

(1) The plant produces highly poisonous tannins

(2) The plant produces quinine which is bitter in taste

(3) The plant produces poisonous cardiac glycosides.

(4) The plant produces thorns which keeps animals away from the plant.

113. Which adaptation of parasite do not help to sustain their life in host body ?

(1) loss of unnecessary sense organ

(2) presence of adhesive organ or suckers to cling onto host

(3) loss of digestive system

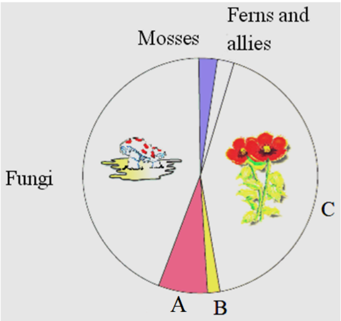
(4) low reproductive capacity

114. Ecosystem properties can not be detected at how many levels given below :-

Deme, Metapopulation, Biosphere, Biome, Organism, Communities, Species, Landscape, Organ system

(1) 5 (2) 6 (3) 4 (4) 3

115.



Above diagram shows proportionate number of species of major taxa of plants, identify the A, B, C plant group :-

	A	B	C
(1)	Lichens	Angiosperms	Algae
(2)	Angiosperms	Algae	Lichen's
(3)	Lichens	Algae	Angiosperms
(4)	Algae	Lichens	Angiosperms

116. According to Tilman, how species rich biological community show more stability:-

(1) Areas with more species show less year to year variation in total biomass

(2) Increased diversity contributed to higher productivity

(3) Provide resistance to invasions by alien species

(4) All of these

117. Read the given statements and select the correct option regarding this.

(i) Ecosystem services provided by nature to human beings such as oxygen for respiration, aesthetic value, etc.

(ii) Direct economic benefits derived from nature by human beings such as food, medicines, etc.

(iii) Every species has an intrinsic value, even if it is not of any economic use to us.

With respect to above given codes (i), (ii) and (iii) choose the correct option.

	Narrowly utilitarian	Broadly utilitarian	Ethical
1	(iii)	(ii)	(i)
2	(ii)	(i)	(iii)
3	(i)	(ii)	(iii)
4	(ii)	(iii)	(i)

118. The human liver fluke depends on two intermediate hosts, they are :-

(1) Snail and fish

(2) Ticks and snail

(3) Snail and pig

(4) Pig and fish

119. Which one is correct

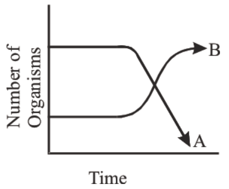
(a) Endangered	Facing a very high risk of extinction in the wild in medium term future
(b) Critically Endangered	Facing a very high risk to extinction in the wild in the near future.
(c) Vulnerable	Facing a high risk of extinction in the wild in the immediate future
(d) Extincted	There is no doubt that the last individual has died

(1) Only a & b is correct
(2) Only c & d is correct
(3) a, b, c, d all are correct
(4) Only d is correct

120. Which of the following is considered as hot-spot of biodiversity in India ?

(1) Eastern Ghats (2) Aravalli Hills
(3) Western Ghats (4) Indo-Gangetic Plain

121. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field A possible reason for these changes is that:



(1) Population B competed more successfully for food than population A

(2) Population A produced more offspring than population B

(3) Population A consumed the members of population B

(4) Both plant populations in this habitat decreased

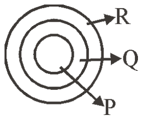
122. Choose the correct match for the following :-

	Column-I		Column-II
a.	Jhoom cultivation	i.	8.1% of the world
b.	Sacred grove	ii.	In-situ conservation
c.	Land area of India	iii.	2.4% of the world
d.	Biodiversity of India	iv.	Deforestation

(1) a-iv, b-ii, c-i, d-iii (2) a-ii, b-iv, c-iii, d-i

(3) a-ii, b-iv, c-i, d-iii (4) a-iv, b-ii, c-iii, d-i

123. Which of the following zone of Biosphere reserve is highly restricted for human activities ?



(1) R (2) Q

(3) P (4) R & Q both

124. In 'rivet popper hypothesis', Paul Ehrlich compared the rivets in an airplane to :

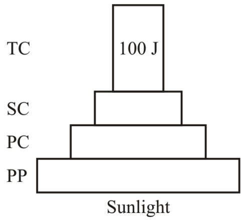
(1) species within a genus

(2) genetic diversity

(3) ecosystem

(4) genera within a family

125. The given ecological pyramid represents pyramid of energy in an ecosystem. What must be the amount of energy in the form of light available to this ecosystem :-



(1) 10,000 J

(2) 1,00,000 J

(3) 1,000,000 J

(4) 10,000,000 J

126. The rate at which light energy is converted into chemical energy of organic molecules in the ecosystem's :-

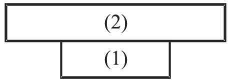
(1) Net primary productivity

(2) Gross secondary productivity

(3) Net secondary productivity

(4) Gross primary productivity

127.



Above pyramid represent.

(1) Pyramid of grassland on the basis of biomass.

(2) Pyramid of grassland on the basis of number.

(3) Pyramid of aquatic ecosystem on basis of biomass

(4) Pyramid of energy

128. (A) NCP = NPP – GSP
(B) GPP = NPP + R
(C) NPP = GPP – R
(D) NSP = GSP – R
(E) NSP = GPP – R
(F) NPP = NCP + GSP

How many equations are correct for productivity:-

(1) Only A, C, D are correct

(2) Only C, D, F are correct

(3) Only A, B, C, D are correct

(4) A, B, C, D, F are correct

129. Leaching is :-

(1) Break down of detritus into smaller particles

(2) Downward movement of water soluble inorganic nutrients in soil

(3) Degradation of detritus into simpler inorganic nutrients

(4) Releasing of inorganic nutrients from humus

130. Incorrect statement is :-

A. No energy that is trapped into an organism remains in it for ever

B. Members of one population may compete for same resources

C. Different biotypes are different species according to biological concept

D. Death of organism is the beginning of the detritus food chain

E. Environmentally adapted groups of the same species are ecotypes

(1) A and C (2) B

(3) B and D (4) E

131. Which of the following ecological components are essential for the maintenance of Ecosystem?

(1) Producers and carnivores

(2) Producers and decomposers

(3) Carnivores and decomposers

(4) Herbivores and carnivores

132. Detritus food chain in comparison to grazing food chain is generally

(1) Longer (2) Equal

(3) Shorter (4) Both 1 & 2

133. Which one of the following animals may occupy more than one trophic levels in the same ecosystem at the same time ?

(1) Snake (2) Sparrow

(3) Wolf (4) Deer

134. Carnivores are –

(1) Usually primary consumer

(2) Usually secondary consumer

(3) Usually secondary and tertiary consumer

(4) Usually decomposer

135. (I) Plant ⟶ Insect ⟶ Frog ⟶ Eagle

(II) Plant ⟶ Rat ⟶ Snake ⟶ Peacock

When food chain I will connected with food chain-II and snake eats frog than snake is :-

(1) Primary consumer

(2) Secondary consumer

(3) Tertiary consumer

(4) Top consumer

SECTION - B (BOTANY)

136. Major conduit of energy flow in a pond occurs through :-

(A) GFC (B) DFC (C) PFC

(D) Predatory food chain

(1) Only A (2) Only B

(3) A & B (4) A & D

137. Standing crop is :-

(i) Biomass in a unit area.

(ii) Numbes of living organism in unit area.

(iii) Amount of inorganic nutrient such as carbon nitrogen calcium in unit area.

(iv) Amount of detritus in unit area

(1) Only i (2) i and ii

(3) i, ii, iv (4) i, iii, iv

138. In which of the following both pairs have correct combination :-

(1) In-situ conservation : Wild life safari park
Ex-situ conservation : Tissue culture

(2) In-situ conservation : Seed Bank
Ex-situ conservation : Biosphere reserve

(3) In-situ conservation : National Park
Ex-situ conservation : Seed Bank

(4) In-situ conservation : Botanical Garden
Ex-situ conservation : Sacred groves

139. Which one of the following is known as kidney of planet ?

(1) Amazon rain forest (2) Ocean

(3) Wetlands (4) Tundra

140. Which plant brought for its purple flower has become a problem in india ?

(1) Parthenium (2) Lantana

(3) Cuscuta (4) Eichhornia

141. Which of the following is not concerned with loss of biodiversity?

(1) Co-existance

(2) Habitat loss

(3) Deforestation

(4) Alien species invasion

142. There are ________ National parks and ________ Hot spots in India :-

(1) 90, 3 (2) 3, 90

(3) 90, 14 (4) 14, 90

143. Out of the "Evil quartet" major cause of biodiversity loss is :-

(1) Co-Extinctions

(2) Over exploitation

(3) Habitat loss and fragmentation

(4) Alian species invasion

144. Exploring molecular, genetic and species level diversity for products of economics importance is called :-

(1) Biomagnification (2) Bioprospecting

(3) Biofortification (4) Bioinformation

145. **Assertion :-** Detritus food chain may be connected with grazing food chain at some levels.

Reason :- Some of the organisms of DFC are prey to the GFC animals and some of the organisms are of Omnivorous nature.

(1) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(2) Assertion is true but Reason is false.

(3) Assertion is false but Reason is true.

(4) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

146. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion (A) : Thick walled spores formed in bacteria and seeds formed in higher plants can be considered as analogous.[similar in function]

Reason (R) : Both seeds and thick walled spores can serve as means to tide over periods of stress.

In the light of the above statements, choose the **correct** answer from the options given below :-

(1) Both A and R are true but R is NOT the correct explanation of A

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are true and R is the correct explanation of A.

147. Consider the following statements-

(A) The function of the reservoir is to meet with the deficit which occurs due to imbalance in the rate of influx and efflux.

(B) Nutrients are never lost from the ecosystem.

Of the above statements.

(1) A and B are correct

(2) A and B are incorrect

(3) A correct and B incorrect

(4) A incorrect and B correct

148. Given below are two statements :

Statement-I : Atmosphere only contains about 1 percent of total global carbon.

Statement-II : Carbon constitutes 49 percent of dry weight of organisms.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both statement-I and statement-II are correct

(2) Both statement-I and Statement-II are incorrect

(3) Statement-I is incorrect and statement-II is correct

(4) Statement-I is correct and statement-II is incorrect

149. **Statement 1 :** Energy flow is unidirectional.

Statement 2 : Firstly plants capture solar energy and then food is transferred from the producers to decomposers.

(1) Both are correct

(2) Both are Incorrect

(3) Statement 1 is correct but 2 is incorrect

(4) Statement 2 is correct but 1 is incorrect

150. **Statement-I :** Out of the total cost of various Ecosystem services, the soil formation accounts for about 70%.

Statement-II : An average price tag of US$ 33 trillion a year on these fundamental ecosystem services.

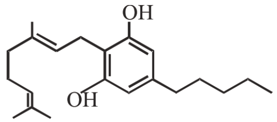
(1) Statement-I & Statement-II both are correct.

(2) Statement-I is correct & Statement-II is incorrect.

(3) Statement-I is incorrect & Statement-II is correct.

(4) Both Statement-I & Statement-II is incorrect.

SECTION - A (ZOOLOGY)

151. 

is the structural formula of :-

(1) Opioid molecule (2) Cannabinoid molecule

(3) Morphine (4) LSD

152. Choose the correct match:-

	Column-I	Column-II
(1)	*Rhino virus*	Infect the alveoli of lung
(2)	*Haemophilus influenzae*	Usually last for 3-7 days
(3)	*Wuchereria bancrofti*	Female culex
(4)	*Entamoeba histolytica*	Aedes agypti

153. Identify correct statements about allergy :

(I) IgE antibodies are produced

(II) Anaphylatic shock is an allergic condition.

(III) Allergy treatment is done by administration of antihistamines.

(IV) AIDS is an allergic disorder.

(1) Only two statements are correct

(2) Only one statement is correct

(3) Only three statements are correct

(4) All Four statements are correct

154. ***Assertion :-*** In severe cases of Pneumonia; the lips and finger nails may turn gray to bluish in colour.

Reason :- In Pneumonia the alveoli get filled with fluid leading to severe problems in respiration.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

155. **Assertion (A) :** α-interferon is given to cancer patient which helps in destroying the tumour.

Reason (R) : α-interferon is biological response modifier, which activates the immune system.

(1) Both assertion and reason are true but reason is not the correct explanation of assertion.

(2) Assertion is true but reason is false.

(3) Assertion is false but reason is true.

(4) Both assertion and reason are true and reason is the correct explanation of assertion.

156. **Statement-I :** Adolescence is the period between 12-18 years of age

Statement-II : Adolescence is a vulnerable phase of mental and psychological development of individual

(1) Both Statement are correct

(2) Statement-I is correct & Statement-II is incorrect

(3) Statement-I is incorrect & Statement-II is correct

(4) Both statement are incorrect

157. Given below are two statements :

Statement-I : *Salmonella typhi* is a pathogenic bacterium which causes diseases of thyroid.

Statement-II : Virus like *Haemophilus influenzae* is responsible for the disease pneumonia.

(1) Both Statement-I and Statement-II are correct

(2) Both Statement-I and Statement-II are incorrect

(3) Statement-I is correct but Statement-II is incorrect

(4) Statement-I is incorrect but Statement-II is correct

158. Dry, scaly lesion on various parts of body such as skin, nails and scalp accompanied by intense itching, heat and Moisture related with which pathogen :-

(1) Epidermophyton

(2) Ascaris

(3) Filarial worm

(4) Entamoeba histolytica

159. Which of the following techniques uses X-rays to generate an image of the internals of an organ ?

(1) Biopsy (2) MRI

(3) CT Scan (4) All of the above

160. In cases of snake bites, the injection which is given to the patients, contain preformed antibodies against snake venom. It is an example of :-

(1) Natural active immunity

(2) Artificial active immunity

(3) Natural passive immunity

(4) Artificial passive immunity

161. How many of the following are example of secondary lymphoid organ?

Bone marrow, Spleen, Thymus, MALT, tonsils, appendix, lymph node

(1) Four (2) Five (3) Six (4) Seven

162. Choose the correct option for the given statements :-

I. Innate immunity has four types of barriers.

II. Acquired immunity is present from the birth and is inherited from parents.

III. Tears, acid in the stomach and saliva prevent microbial growth.

	I	II	III
(1)	True	False	True
(2)	True	True	False
(3)	False	False	True
(4)	False	True	True

163. How many of the following is/are viral diseases ?

malaria, common cold, Diptheria, plague, Typhoid

(1) 1 (2) 3

(3) 2 (4) 5

164. It was thought that persons with ___A____belonged to hot personality and would have ___B____.Findout correct answer about A & B.

(1) A - Blackbile B – Pneumonia

(2) A - Yellow bile B – Common cold

(3) A - Cough B – Cancer

(4) A - Black bile B – Fever

165. Which of the following factors are responsible to maintain good health ?

(1) Balance diet

(2) Personal Hygiene

(3) Yoga and Regular exercise

(4) All of the above

166. Which provide micro-environment for the development and maturation of B-lymphocytes ?

(1) Spleen (2) Thymus

(3) Bone marrow (4) Both (2) and (3)

167. The site where lymphocytes interact with antigens and proliferate to become effector cell is/are?

(1) Thymus

(2) Peyers patches and bone marrow

(3) Bone marrow and thymus

(4) Tonsils and spleen

168. Sustained high fever (39-40ºC), stomach pain, loss of appetite are seen in a person suffering from -

(1) Pneumonia (2) Amoebiasis

(3) Typhoid (4) Malaria

169. Which does not support the reason for youth starting drugs or alcohol habits ?

(1) Curiosity

(2) Stress

(3) To Look progressive

(4) Supportive family structures

170. Which of the following statements is not correct.

(1) LSD drug is obtained from fungi.

(2) Cannabinoids are also being abused by some sports persons.

(3) Morphine is very effective sedative and pain killer.

(4) Cocaine is obtained from *Erythroxylum coca*, a plant native to Africa

171. Match List I with List II :

	List I		List I
A.	Cocaine	I.	Effective sedative in surgery
B.	Heroin	II.	*Cannabis sativa*
C.	Morphine	III.	*Erythroxylum*
D.	Marijuana	IV.	*Papaver somniferum*

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-I, D-II

(2) A-I, B-III, C-II, D-IV

(3) A-II, B-I, C-III, D-IV

(4) A-III, B-IV, C-I, D-II

172. Which of the following statement is incorrect regarding AIDS ?

(1) It is caused by Human Immuno deficiency virus, a member of group of viruses called retrovirus.

(2) There is always a time-lag between the infection and appearance of AIDS symptoms.

(3) A widely used diagnostic test for AIDS is ELISA.

(4) There is progressively decrease in number of B-lymphocytes in body of infected person.

173. Which of the following drugs are abused by sport persons to enchance their performance ?

(1) Narcotic analgesics (2) Anabolic steroids

(3) Diuretics (4) All of these

174. **Statement-I :** Ionising radiations like x-rays and gamma rays and non-ionizing radiations like UV cause DNA damage.
Statement-II : Transformation of normal cells into cancerous neoplastic cells may be induced by carcinogens.

(1) Both statement-I and II are true

(2) Both statement-I and II are false

(3) Only statement-I is true

(4) Only statement-II is true

175. Which of the following is not a warning sign of drug abuse ?

(1) Fluctuation in weight

(2) Lack of interest in personal hygiene

(3) increase interest in hobbies

(4) Change in sleeping habits

176. Withdrawal syndrome occurs when regular does of drug-

(1) is taken continuously for long duration.

(2) is reduced slowly & discontinued.

(3) is abruptly discontinued.

(4) is reduced in doses but increase in frequency.

177. Which cell acts as factory of HIV ?

(1) Macrophage (2) Helper T cells

(3) Killer T cells (4) B-cells

178. The genome of HIV, the causative organism of AIDS, is made up of:-

(1) ssRNA (2) ssDNA

(3) dsRNA (4) dsDNA

179. Which of the following pair is not cannabinoids ?

(1) Charas, Ganja

(2) Datura, LSD

(3) Charas, Hashish

(4) Marijuana, Bhang

180. Several genes called _______ have been identified in normal cells which when activated will turn into _______ under certain conditions and could lead to cancerous transformation of cells.
Complete the above paragraph by selecting correct sequence of words.

(1) oncogenes, sucidal genes

(2) tumor supressor genes, protooncogenes

(3) protooncogenes, oncogenes

(4) oncogenes, protooncogenes

181. Disease that spreads due to conscious behaviour pattern is ?

(1) Cancer (2) Common Cold

(3) AIDS (4) Pneumonia

182. Which of the following disease is caused by protozoan :-

(1) Typhoid (2) Common cold

(3) Filariasis (4) Malaria

183. Anamnestic response is -

(1) Feeble (2) Low intensified

(3) Highly intensified (4) primary response

184. PMNL are included in which barrier ?

(1) Physical (2) Physiological

(3) Cellular (4) Cytokine

185. In which disease groin is affected ?

(1) Ascariasis (2) Amoebiasis

(3) Ringworms (4) Hepatitis-B

SECTION - B (ZOOLOGY)

186. Saliva of mouth and tears of eye are included under which barrier ?

(1) Physiological barrier (2) Physical barrier

(3) Cellular barrier (4) Cytokine barrier

187. Which of following are the cells of cellular barrier of innate immunity ?

(1) PMNL (2) Monocyte

(3) B-Lymphocyte (4) Both (1) & (2)

188. Rheumatoid arthritis is a :-

(1) Bacterial infection

(2) Auto-immune disorder

(3) Viral infection

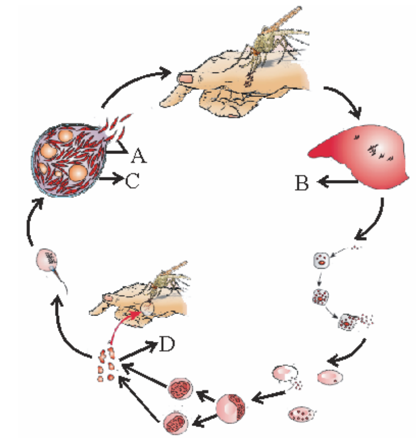
(4) Allergy

189. Which is the "Allergic antibody" ?

(1) IgE (2) IgA

(3) IgD (4) IgM

190. Identify the A, B, C, D in the following life cycle.



Options :-

	A	B	C	D
(1)	Gametocyte	Salivary gland	Liver	Sporozoites
(2)	Sporozoites	Salivary gland	Liver	Gametocyte
(3)	Sporozoites	Liver	Salivary gland	Gametocyte
(4)	Sporozoites	Liver	Gametocyte	Salivary gland

191. Which of the following statement is correct about benign tumor ?

(1) It usually spreads to other parts of body

(2) It causes huge damage to the tissues concerned

(3) Normally remain confined to its original location

(4) It is characterised by metastasis

192. Which of the following is not a component of innate immunity ?

(1) Interferons (2) Phagocytes

(3) Skin (4) Antibodies

193. Hepatitis-B vaccine produced from :-

(1) Bacteria

(2) Recombinant RNA technology

(3) Fungus (yeast)

(4) Both (2) and (3)

194. *Plasmodium* enters the human body as ?

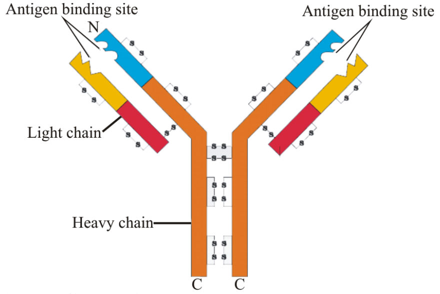
(1) Gametocyte (2) Sporozoite

(3) Trophozoite (4) Haemozoin

195. Given below are pairs of pathogens, disease caused by them and their classification. Which is **incorrectly** matched ?

	Disease	**Pathogen**	**Causative agent**
(1)	Pneumonia	*Haemophilus influenzae*	Bacteria
(2)	Typhoid	*Salmonella*	Bacteria
(3)	Filariasis	*Microsporum*	Round worm
(4)	Chikungunya	Virus	Chikungunya Virus

196. How many of the below are correct about given diagram :-



(a) Mediator of AMI

(b) T-cells them selves do not secrete but help B-cell produce them

(c) H_2L_2 molecule

(d) Glycoprotein molecule

(1) one (2) two

(3) three (4) four

197. Identify the correct match from the columns I, II and III :-

	Column-I		**Column-II**		**Column-III**
1	Bacteria	a	*Plasmodium*	i	Infection of lungs
2	Virus	b	*Wuchereria bancrofti*	ii	Fever with chill
3	Protozoa	c	*Haemophilus influenzae*	iii	Inflammation of lower limbs
4	Helminth	d	Rhino virus	iv	Infection of upper respiratory tract

(1) 2-c-i, 1-d-iv, 3-a-ii, 4-b-iii

(2) 3-a-ii, 4-b-iii, 2-c-iv, 1-d-i

(3) 4-b-iii, 3-a-ii, 1-c-i, 2-d-iv

(4) 4-b-iii, 3-a-i, 1-c-ii, 2-d-iv

198. How many statements given below are the examples of 'Naturally Acquired passive immunity ?

(a) Interferons which protects non infected cells from further viral infection

(b) The foetus receives some antibodies from their mothers through placenta during pregnancy

(c) Colostrum secreted by mother during the initial days of lactation has abundant IgA antibodies to protect the infants

(d) ATS (Anti-tetanus serum) provides temporary protection in case of injuries and burns

(1) one (2) two

(3) three (4) four

199. Read the following statements ?

(a) More efficient at work

(b) Decreases productivity

(c) Brings economic prosperity

(d) Increases longevity of people

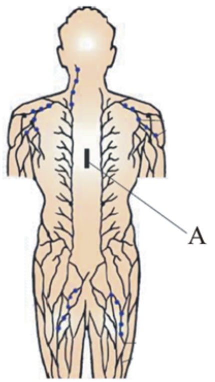
(e) Increases infant and maternal mortality

How many statements are correct about healthy people :-

(1) Two (2) Three

(3) Four (4) All are correct

200. Which of the following statement is false for the structure labelled as "A" in the figure given below?



(1) Here maturation of T-lymphocytes takes place

(2) Here immature lymphocytes differentiate into antigen-sensitive lymphocytes

(3) Here lymphocytes interact with antigen and become effector cells

(4) It is an example of primary lymphoid organ.

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